HIGHLIGHTS

REVISION NO. 33 Jun 01/10

Pages which have been revised are outlined below, together with the Highlights of the Revision

CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
CHAPTER 12		
L.E.P. 1- 5	Revised to Reflect this revision indicating new,revised, and/or deleted pages	
T. OF C. 1, 3- 4, 6	Revised to reflect this revision	
12-11-28 306- 309, 312- 313, 320- 397	Effectivity updated at the bottom of the page Mod.5981H5131 removed **WINGS - TOP SKIN - MODIFY OVERWING REFUELING CAP** Minor, non technical corrections **PARA.5.C.(1): NOMENCLATURE OF NOTE AMENDED.** Minor additions and amplification **PARA. 5.C. STEPS (8)(D) & (E) REVISED.** **NEW INSTRUCTIONS INTRODUCED TO MAKE SURE THE RELATED HIGH LEVEL LIGHTS ARE ON FOR ANY TANK THAT HAS BEEN FULLY REFUELED. IF THE OUTER TANKS ARE NOT FULLY REFUELED AND THE INNER, CENTER AND TRIM TANK ARE EMPTY - USE THE MLI'S TO CHECK THE FUEL QUANTITY IN THE OUTER TANKS AGAIN AND MAKE A RECORD IN THE AIRCRAFT LOG BOOK.** Layout improved Effectivity updated in the text	
12-12-29 3, 6- 7	Layout Improved or Effectivity Updated	
12-12-32 21- 22, 38- 40	Minor additions and amplification **IMPROVED LAYOUT**	
12-13-27 17	Minor additions and amplification **STEP B. (1) (C) ALIGNED**	
12-13-79 02 2- 12	Minor additions and amplification **ADDED THREE CAUTIONS IN REGARD TO OIL LOSS.**	

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CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
12-16-38 1- 2, 4- 5	Effectivity updated at the bottom of the page Effectivity updated in the text	
12-21-11 3- 8	Minor additions and amplification ADDED:"YOU CAN USE ADHESIVE TAPE TO GET BETTER SEALING. RECORD THE LOCATIONS WHERE YOU PUT THE ADHESIVE TAPE".	
12-22-00 1- 3	Minor additions and amplification REVISED GREASE REPLACEMENT PROCEDURE.	
12-22-32 4- 7	Layout Improved or Effectivity Updated	
12-22-52 8	Layout Improved or Effectivity Updated	
12-22-78 01 1- 4	Minor additions and amplification ADDED INSTRUCTION NOT TO MIX GREASE TYPES WHEN LUBRICATING THE BALLSCREW ACTUATOR.	
12-31-28 202	Minor additions and amplification PARA. 2.B. NEW NOTE INTRODUCED TO STATE: 'YOU CAN ALSO DO THIS PROCEDURE OUTSIDE OF A HANGAR IF A HANGAR IS NOT AVAILABLE'.	
12-32-28 301- 306, 308- 323	Effectivity updated at the bottom of the page Mod.0001X0057 removed TECHNICAL PUBLICATION-BASIC MODIFICATION. Mod.8340D8612 incorporated X Mod.8679H5290 incorporated FUEL - TRIM TANK - INSTALL WATER SCAVENGE SYSTEM - Mod.8681H5293 incorporated FUEL - INNER TANKS - INSTALL WATER SCAVENGE ON A300-310 - SB 28-2049 04 incorporated FUEL - INSTALL A WATER SCAVENGE SYSTEM IN THE TRIM TANK AND INNER TANKS Minor additions and amplification PARA. 1.A. NOTE 1 REVISED. INFORMATION AMENDED TO READ: 'IF THE OUTSIDE AIR TEMPERATURE IS LESS THAN 0 DEG C. AND YOU CANNOT DRAIN THE FUEL/WATER BECAUSE OF ICE IN THE TANKS, THEN DO THE COLD	

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CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
	WEATHER MAINTENANCE PROCEDURES...'	
	Layout improved	
	Effectivity updated in the text	
12-32-29	Minor additions and amplification	
5, 7	**ADDED NOTE**	
	MODIFIED MEASURING UNIT	
12-33-21	Minor additions and amplification	
1	**REPLACED CAUTION BY WARNING**	
12-37-32 01	Minor additions and amplification	
1- 2,	**REPLACED MATERIAL 04-004 BY MATERIAL 11-026**	
4- 6,		
10- 11		
12-37-32 02	Effectivity updated at the bottom of the page	
1- 7,	Minor, non technical corrections	
10- 11,	**DELETED ILLUSTRATION**	
14- 17	Minor additions and amplification	
	Reprinted	

CHAPTER 12

SERVICING

LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively
Remove and insert the affected pages and complete the Record of Revisions and the Record of Temporary Revisions as necessary

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12-31-10	01	212	Jun01/04
12-31-10	01	213	Jun01/04
12-31-10	01	214	Jun01/04
12-31-10	01	215	Jun01/04
12-31-10	01	216	Jun01/04
12-31-10	01	217	Jun01/04
12-31-10	01	218	Jun01/04
12-31-10	01	219	Jun01/04
12-31-10	01	220	Jun01/04
12-31-10	02	201	Jun01/04
12-31-10	02	202	Jun01/04
12-31-10	02	203	Jun01/04
12-31-10	02	204	Jun01/04
12-31-10	02	205	Jun01/04
12-31-10	02	206	Jun01/04
12-31-10	02	207	Jun01/04
12-31-10	02	208	Jun01/04
12-31-10	02	209	Jun01/04
12-31-10	02	210	Jun01/04
12-31-10	02	211	Jun01/04
12-31-10	02	212	Jun01/04
12-31-10	02	213	Jun01/04
12-31-10	02	214	Jun01/04
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12-31-10	02	216	Jun01/04
12-31-10	02	217	Jun01/04
12-31-10	02	218	Jun01/04
12-31-10	02	219	Jun01/04
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12-31-12		2	Jun01/08
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12-31-28		210	Jun01/09
12-31-28		211	Jun01/09
12-31-28		212	Jun01/09
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12-31-29	01	202	Jun01/04
12-31-29	02	201	Jun01/04
12-31-29	02	202	Jun01/04
12-31-31		1	Dec01/95
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12-31-35		1	Dec01/06
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12-31-52		2	Dec01/96
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12-31-71		1	Jun01/04
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12-32-24		301	Dec01/96
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12-32-28		307	Jun01/09
12-32-28	R	308	Jun01/10
12-32-28	R	309	Jun01/10
12-32-28	R	310	Jun01/10
12-32-28	R	311	Jun01/10
12-32-28	R	312	Jun01/10
12-32-28	R	313	Jun01/10
12-32-28	R	314	Jun01/10
12-32-28	R	315	Jun01/10
12-32-28	R	316	Jun01/10
12-32-28	R	317	Jun01/10
12-32-28	R	318	Jun01/10
12-32-28	R	319	Jun01/10
12-32-28	R	320	Jun01/10
12-32-28	R	321	Jun01/10
12-32-28	N	322	Jun01/10
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12-32-29		6	Dec01/90
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CHAPTER 12

SERVICING

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1. General
This chapter covers aircraft servicing.

2. "NO STEP" Areas (Ref. Fig. 001)
On the aircraft, "NO STEP" areas are delineated by a black paint strip. English or bilingual markings are oriented so as to be legible when the aircraft is approached from either the front or the rear and give the following information.
"DO NOT WALK OUTSIDE THIS AREA"

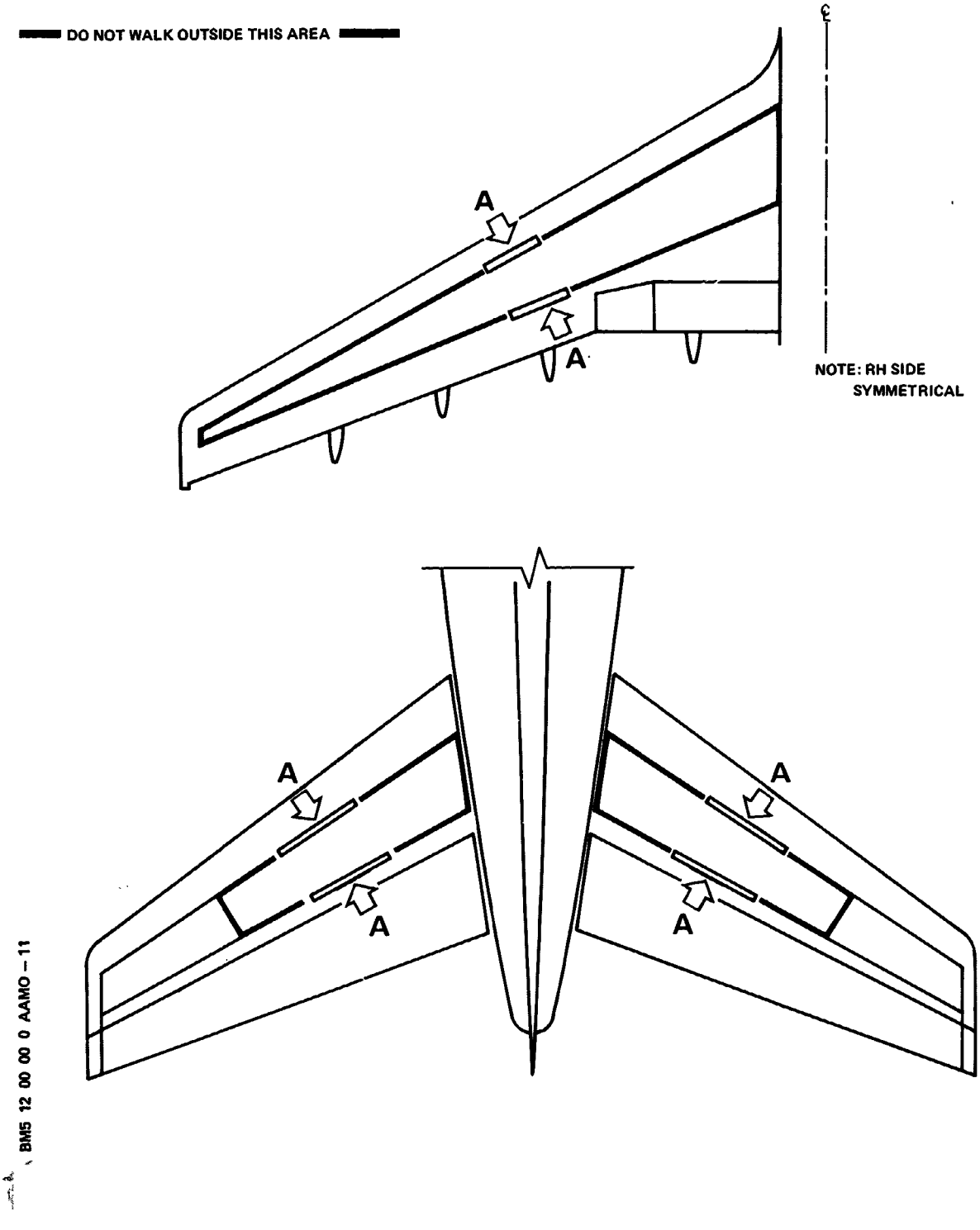
3. Connection Points of Services (Ref. Fig. 002)

ITEM	DESIGNATION	Mean Height from Ground Meters (ft. in.)
A.	Oxygen Charging	Avionics Compartment
B.	Potable Water Filling and Draining	2.50 (8.2)
B1.	Potable Water Rinsing and Draining	2.20 (7.3)
C.	HP Conditioning and Engine Starting	1.90 (6.2)
C1.	LP Preconditioning	2.25 (7.5)
D.	Fuel Pressure Filling	4.50 (14.9)
D1.	Fuel Gravity Filling	4.70 (15.5)
E.	Yellow Hydraulic Ground Power	3.50 (11.6)
E1.	Hydraulic Accumulator Nitrogen Charging	Hydraulics Compartment
E2.	Blue Hydraulic Ground Power	3.50 (11.6)
E3.	Hydraulic Reservoir Air Pressurizing	3.50 (11.6)
E4.	Green Hydraulic Ground Power	3.00 (9.10)
E5.	Hydraulic Reservoir Filling	3.00 (9.10)
F.	Forward Toilet Servicing	3.25 (10.8)
F1.	Aft Toilet Servicing	4.25 (13.11)
G.	Electrical Ground Power	2.00 (6.7)

4. Replenishment (Ref. 12-10-00)
This part provides the information required for carrying out replenishing procedures, which are classified as follows :
- 12-11-00, Fuels
- 12-12-00, Hydraulic Fluids
- 12-13-00, Oil
- 12-14-00, Gas
- 12-15-00, Water
- 12-16-00, Toilet Sanitary Fluid

In order to make it easier for the reader to locate the information, the last two digits indicate the ATA chapter concerned.
Examples :
- 12-12-29, Hydraulics
- 12-13-24, Electrical Power

A



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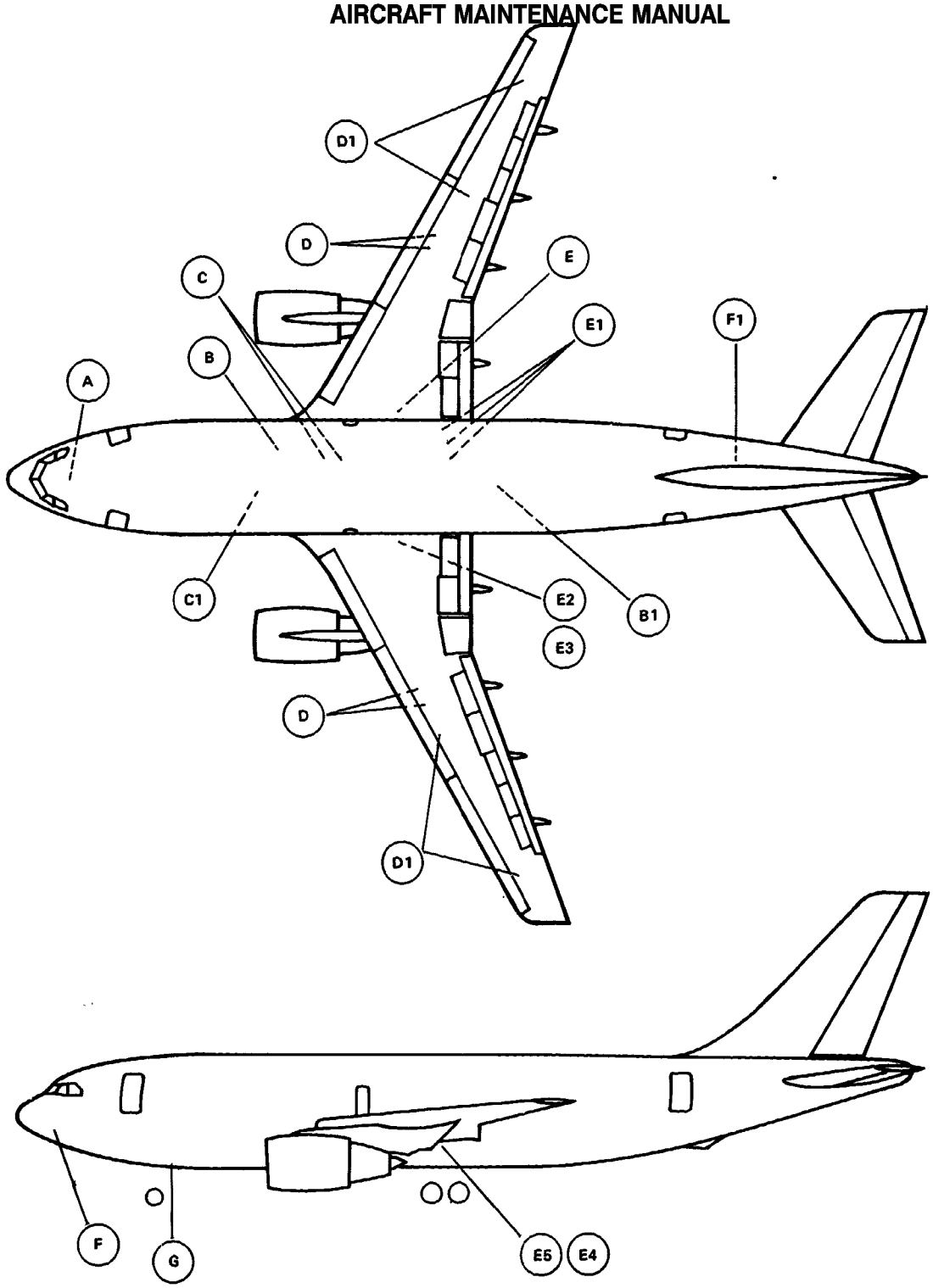
"NO STEP" Areas
Figure 001



Connection Points of Services
Figure 002

- 12-14-35, Oxygen
- 12-15-38, Potable Water

5. Scheduled Servicing (Ref. 12-20-00)
The following topics cover the scheduled servicing procedures :
R - 12-21-00, Cleaning
- 12-22-00, Lubrication
In order to make it easier for the reader to locate the information on lubrication, the last two digits indicate the ATA chapter concerned.
Example :
- 12-22-27, Flight Controls
- 12-22-32, Landing Gear

6. Unscheduled Servicing (Ref. 12-30-00)
The following topics cover the unscheduled servicing procedures
- 12-31-00, Aircraft Protection
- 12-32-00, Sampling for Analysis
- 12-36-00, System Line Flushing
- 12-33-00, Pre-Conditioning

WINGRIP AND SAFETY ROPE - MAINTENANCE PRACTICES

1. Wingrip and Safety Rope

WARNING : MAKE SURE THAT THE FLIGHT CONTROL SAFETY-LOCKS AND THE WARNING NOTICES ARE IN POSITION.
WARNING : MAKE SURE THAT YOU ARE ALWAYS ATTACHED WHEN YOU ARE ON THE WING.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 to 6 m (6 to 20 ft)
B.	Warning Notice
C. 15300-00	Wingrip
Referenced Procedures - 27-50-00, P. Block 301	Extension and Retraction of the Flaps on the Ground

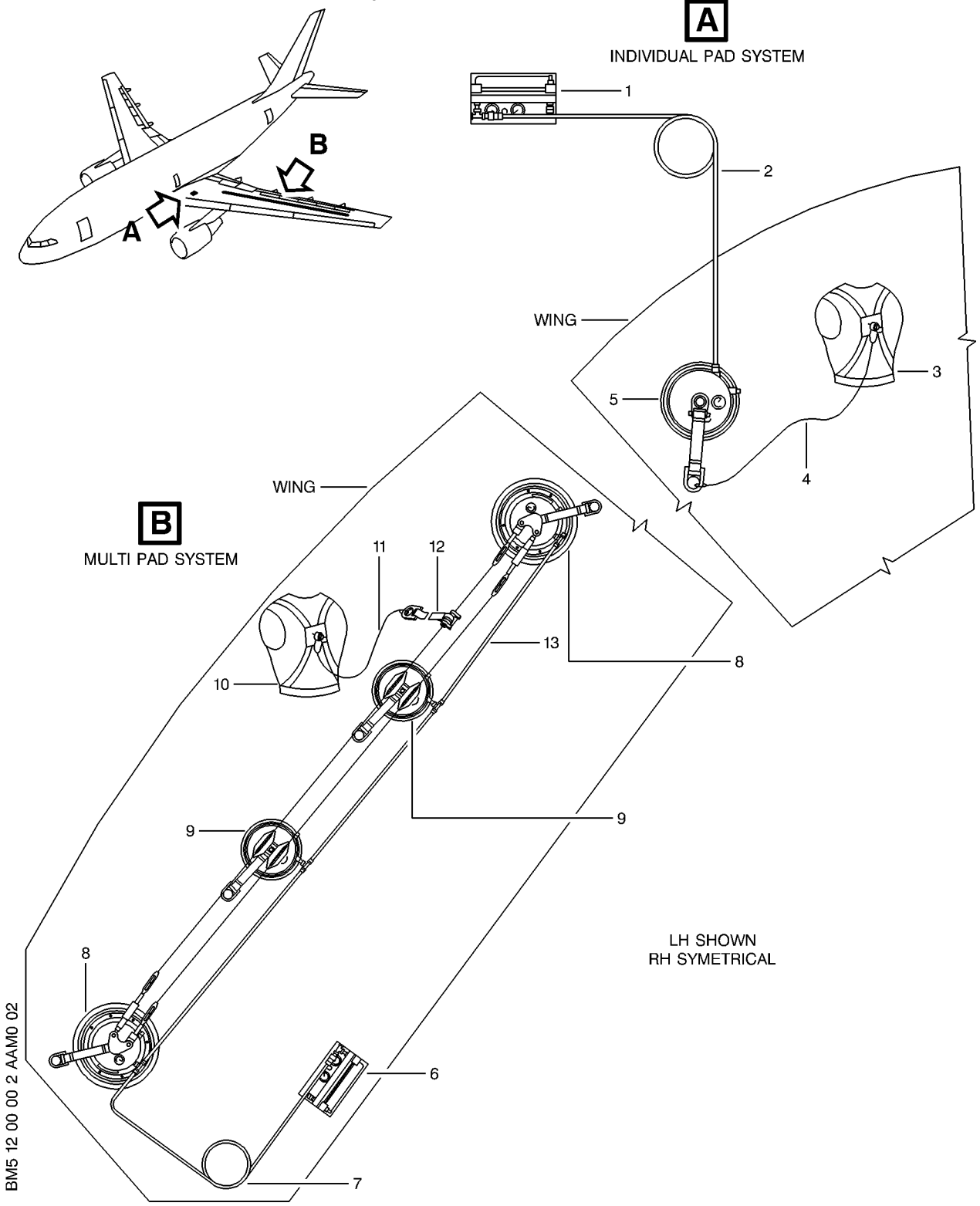
A. Safety Precautions
(1)Make sure that the flaps and slats are retracted (Ref. 27-50-00, P. Block 301).
(2)Make sure that the warning notice is in the cockpit to tell persons not to operate the flap and slat control lever.
(3)Make sure that the adjustable access platform is in position at the wing.

(Ref. Fig. 201)

3. Procedure

A. Installation of the Wingrip 15300-00
Refer to the Wingrip manufacturer's instructions for installation of the Wingrip system.
NOTE : Only personnel with special training are authorized to install/use the Wingrip system
(1) The Wingrip system is composed of the individual pad system and the multi pad system.
(a) Individual pad system
The individual pad system contains a Wingrip single point anchor (5) placed on the wing in an area close to the working zone and connected to the vacuum module (1) by a primary hose (2). The body harness (3) is attached to the Wingrip single point anchor with the double lanyard (4).
(b) Multi pad system
The multi pad system contains two Wingrip end anchors (8) connected to the vacuum module (6) by a primary hose (7) and Wingrip intermediate anchors (9) and secondary hoses (13) (quantity dependent on the system length). The body harness (10) (one per user) is attached to the Wingrip shuttle (12) with the double lanyard (11).

B. Removal of the Wingrip 15300-00



Installation of the Wingrip
Figure 201

(1) Refer to the Wingrip manufacturer's instructions for removal of the Wingrip individual pad system and the Wingrip multi pad system.

4. Close-up

A. Put the aircraft back to its initial configuration.
(1) Remove the access platform.
(2) Remove the warning notice.
(3) Make certain that the working area is clean and clear of tools and other items.

DRAG REDUCTION AND FUEL CONSERVATION - CHECK LIST

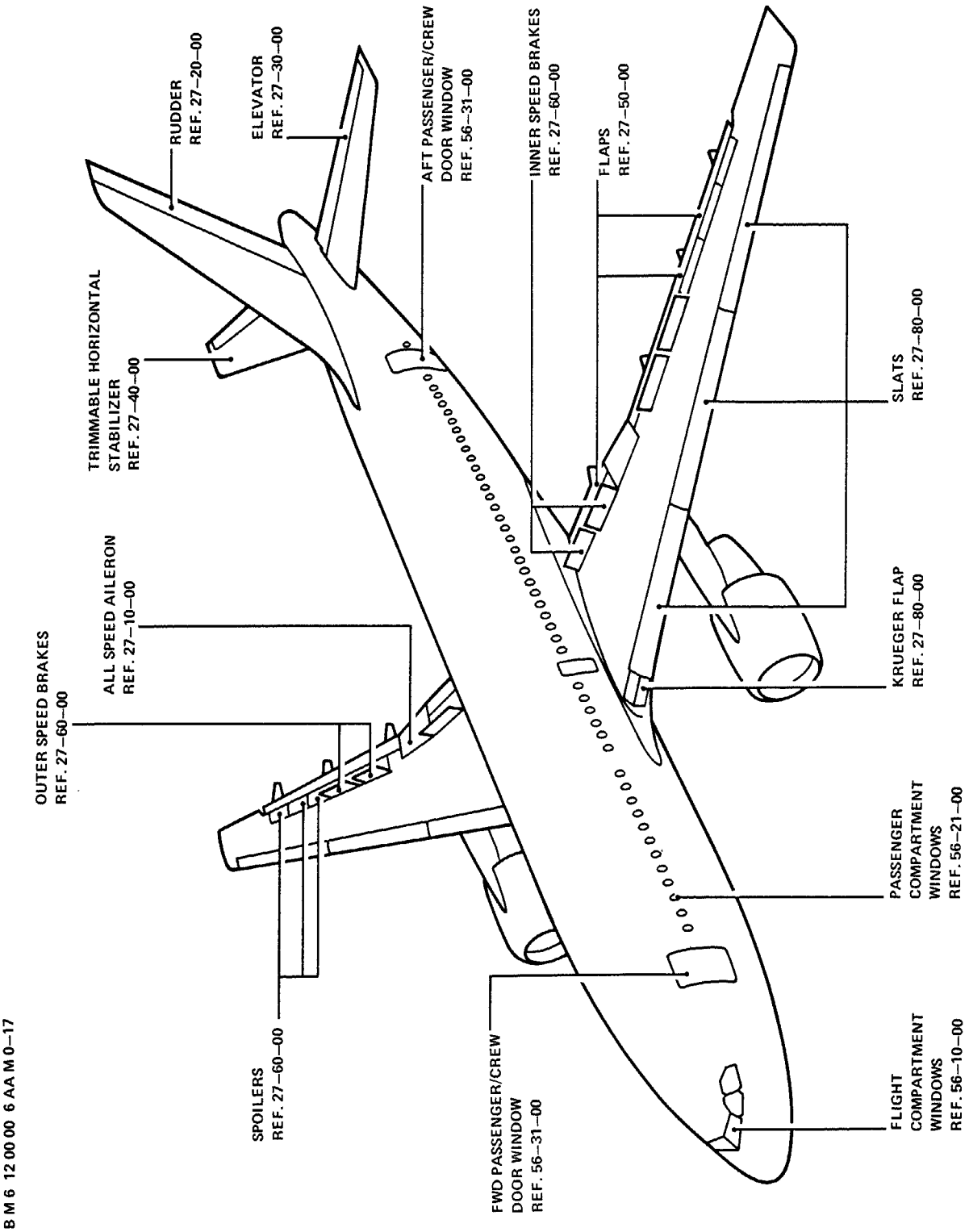
WARNING : REFER TO RELEVANT CHAPTER FOR SAFETY PRECAUTIONS IN WORK AREA.

1. Reason for the Job

A. To minimize drag and reduce fuel consumption

2. Equipment and Materials

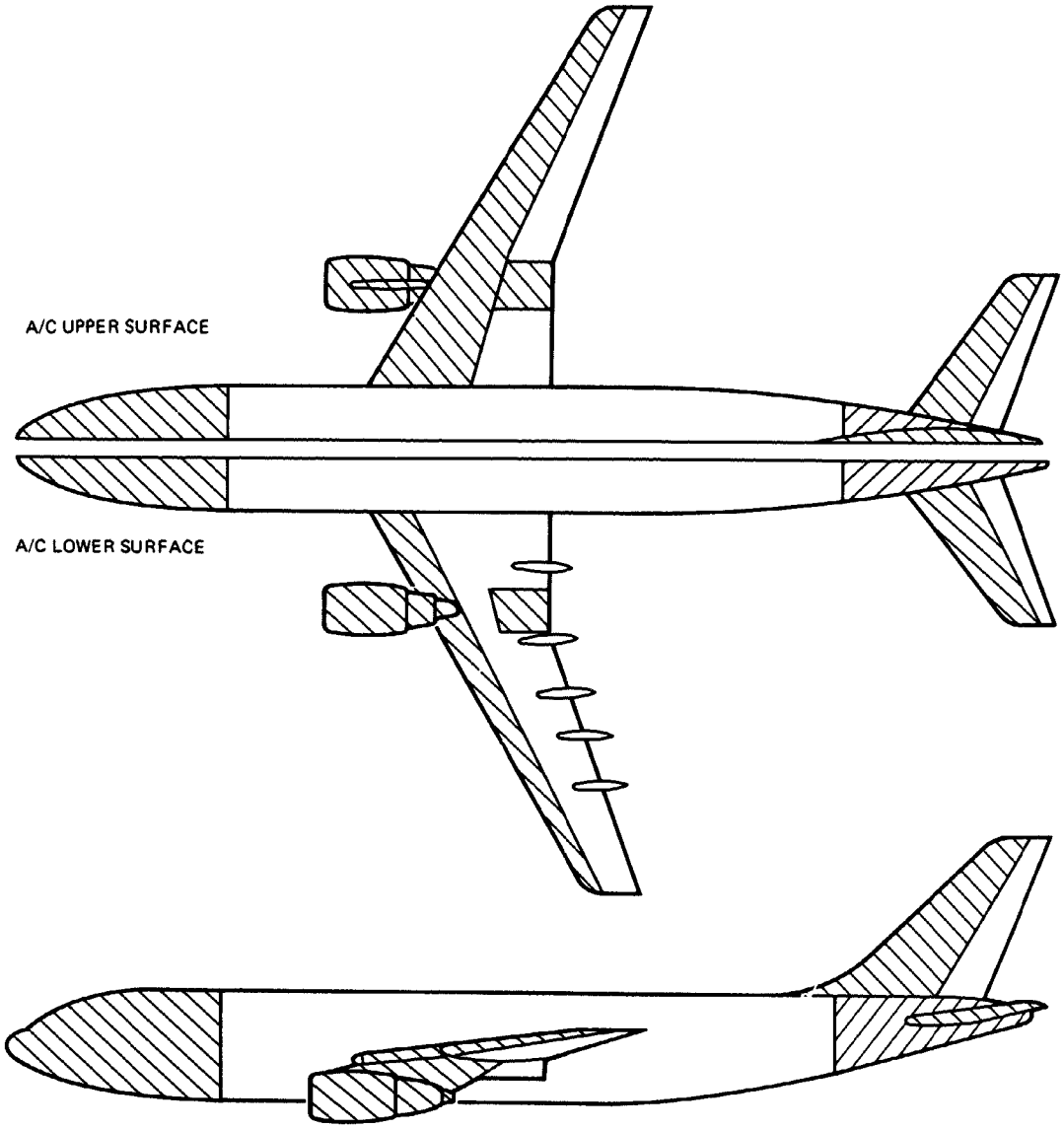
ITEM	DESIGNATION
A.	Access Platform, as required
B.	Access Steps, as required
C.	Protective Mats
Referenced Procedures (Ref. Fig. 601)	
- 12-14-32, P. Block 1	Inflating and Charging - Landing Gear
- 12-21-11, P. Block 1	External Cleaning
- 12-37-32, P. Block 1	Wheel Replacement
- 51-21-20, P. Block 701	Protection (Wax and Polish) of Unpainted Light Alloy Areas
- 51-73-10, P. Block 801	Repair of Minor Damage
- 51-74-10, P. Block 801	Removal of Corrosion
- 51-75-10, P. Block 801	Repair of Paint Coatings
- 51-76-10, P. Block 801	Repair of Sealing
- 56-12-00, P. Block 401	Sliding Side Windows
- 72-00-00, P. Block 501	Engine - General
- 72-00-00, P. Block 701	Engine - General
- 72-32-00, P. Block 601	Compressor Variable Stator Assembly



Controls and Windows - Location
Figure 601

3. Drag Reduction - General

A. The aerodynamic smoothness of the aircraft is classified into three drag sensitive zones as follows:
(1) High Aerodynamic Smoothness (Zone 1)
(a) Deviations in surface profile and jig tolerance deviations in this zone result not only in significant drag increases but can also adversely affect the stability, control and safety of the aircraft.
(2) Good Aerodynamic Smoothness (Zone 2)
(a) Deviations in surface profile in this zone can considerably increase drag and fuel costs.
(3) Normal Aerodynamic Smoothness (Zone 3)
(a) Deviations in surface profile in this zone increase drag and subsequently the fuel penalty, however, the actual increments involved are less significant.
(Ref. Fig. 602)



	ZONE 1	HIGH AERODYNAMIC SMOOTHNESS
	ZONE 2	GOOD AERODYNAMIC SMOOTHNESS
	ZONE 3	NORMAL AERODYNAMIC SMOOTHNESS

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Aerodynamic Zones
Figure 602

4. Procedure

R NOTE : This procedure contributes to fuel savings.

A. Job Set-Up
(1)Position access platform and/or steps, as required. Make sure that protective covers are installed.
(2)Position protective mats, where necessary.

B. Drag Reduction - Cleaning/Painting
(1)Cleaning of Aircraft External Surfaces
(a)Dirt and stains should be removed from aircraft external surfaces (Ref. 12-21-11, P. Block 1).
(b)Paint coating should be smooth and free from damage i.e. chipping, abrasions, errosion etc. Repair if damaged (Ref. 51-75-10, P. Block 801).
(c)External unpainted surface of aircraft should be waxed and polished (Ref. 51-21-20, P. Block 701).
(d)Typical drag penalties in US gallons/year for 0.3 mm (0.012 in.) of skin roughness for 1.0 m^2 (10.76 ft^2) of surface.

ITEM	US gal/yr	
	ZONE 1	ZONE 2
Fuselage	480	343
Wing Surface (upper)	1850	1150
Wing Surface (lower)	554	450
Tail	630	415

(2)Cleaning of Engine
(a)Pylon and exhaust nozzle should be clean (Ref. 72-00-00, P. Block 701).
(b)Periodically wash engine with water to minimize compressor contamination (Ref. 72-00-00, P. Block 701).

C. Drag Reduction - Servicing
(1)Lubrication
(a)Lack of lubrication of moveable items, i.e. control surfaces, wheels, nose wheel steering etc, will cause fuel consumption penalties (Ref. CHP. 12).
(2)Engines
(a)Engine and intake should be correctly aligned.
(b)Exhaust nozzle should be serviceable i.e. no loose patches or rivets, cracks etc.
(c)Compressor blades should be checked for binding and erosion (Ref. 72-32-00, P. Block 601).
(d)Engine controls should be correctly adjusted (Ref. 72-00-00, P. Block 501).
(3)Brakes
(a)Binding brakes will cause severe fuel consumption penalties (Ref. 12-37-32, P. Block 1).
(4)Tire Pressure
(a)Tires should be inflated to the correct inflation pressure (Ref. 12-14-32, P. Block 1).
(5)Seals
(a)Seal should be serviceable, continuous with no gaps or omissions.
(b)The correct seal should be installed.
(c)Seal should be correctly installed, sufficiently compressed to form air tight seal and not protrude into airflow.
(d)Typical drag penalties in US gallons/year/meter length of missing seal.

Moveable Surface	US gal/yr
Slats (spanwise)	1900
Flaps (chordwise)	4005
Elevator	145

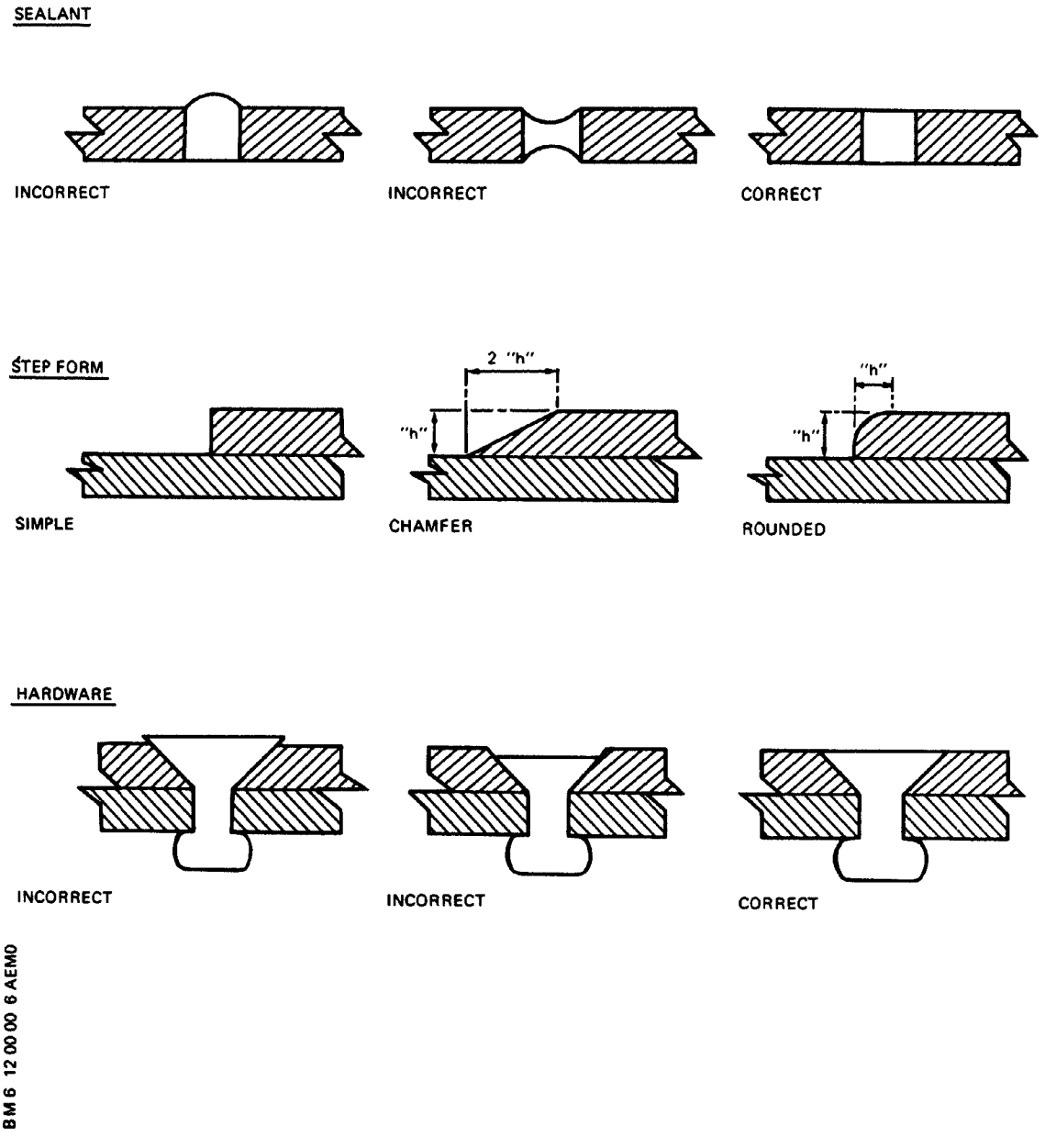
(6)Butt Joints

(a)Butt joints should be flush and not protrude into airflow.

(b)Typical drag penalties for butt joints in US gallons/year/meter length of unfilled gap.

ITEM and ZONE	Gap Depth mm	US gal/yr Gap width in mm		
		2	5	10
Fuselage Zone 1	2	7	19	38
	4	8	22	44
(for Zone 2, divide value by 1.4)	6	9	25	48
Wing surface Zone 1	2	8	18	37
	4	9	23	45
(for Zone 2, divide value by 1.33)	6	10	28	53
Tail Surfaces Zone 1	2	9	22	46
	4	10	26	52
(for Zone 2, divide value by 1.4)	6	11	28	56

(7)Hardware (Ref. Fig. 603)
(a)Check for loose rivets, bolts, fasteners etc.
1 Loose rivets must be replaced.
2 Bolts must be tightened or replaced.
3 Fasteners must be serviceable and flush with exterior surface, adjust or replace as necessary.
4 Make certain that correct hardware is installed.
(8)Fittings
(a)Fittings, i.e. antennas, drain masts, lights etc. should be correctly installed and serviceable. Pay particular attention to leading edges, oversize gaskets, sealant etc.
(9)Fixed Panels
(a)Panel should be flush with exterior surface. Install packing if necessary.
(b)Fasteners must be serviceable and not protrude into airflow.
(c)Panel must be serviceable and not distorted. Gaps between panel and external surface must not be excessive.
(10)Windows
(a)Flight compartment fixed windows.
1 Check that windows are correctly installed and sealed.
(b)Passenger compartment and door windows.
1 Check that seal is correctly installed and serviceable.
(11)Sealants (Ref. Fig. 603)
(a)Check condition of sealant and repair as required.
(b)Make certain that sealant filled gaps are flush with external surfaces.



Sealant and Step Form
Figure 603

D. Drag Reduction - Adjustment

(1)Gaps and Skin Offsets

(a)Check that gaps are kept to a minimum; dimension and skin offsets are optimum.

(b)Gaps should be filled with sealant where necessary.

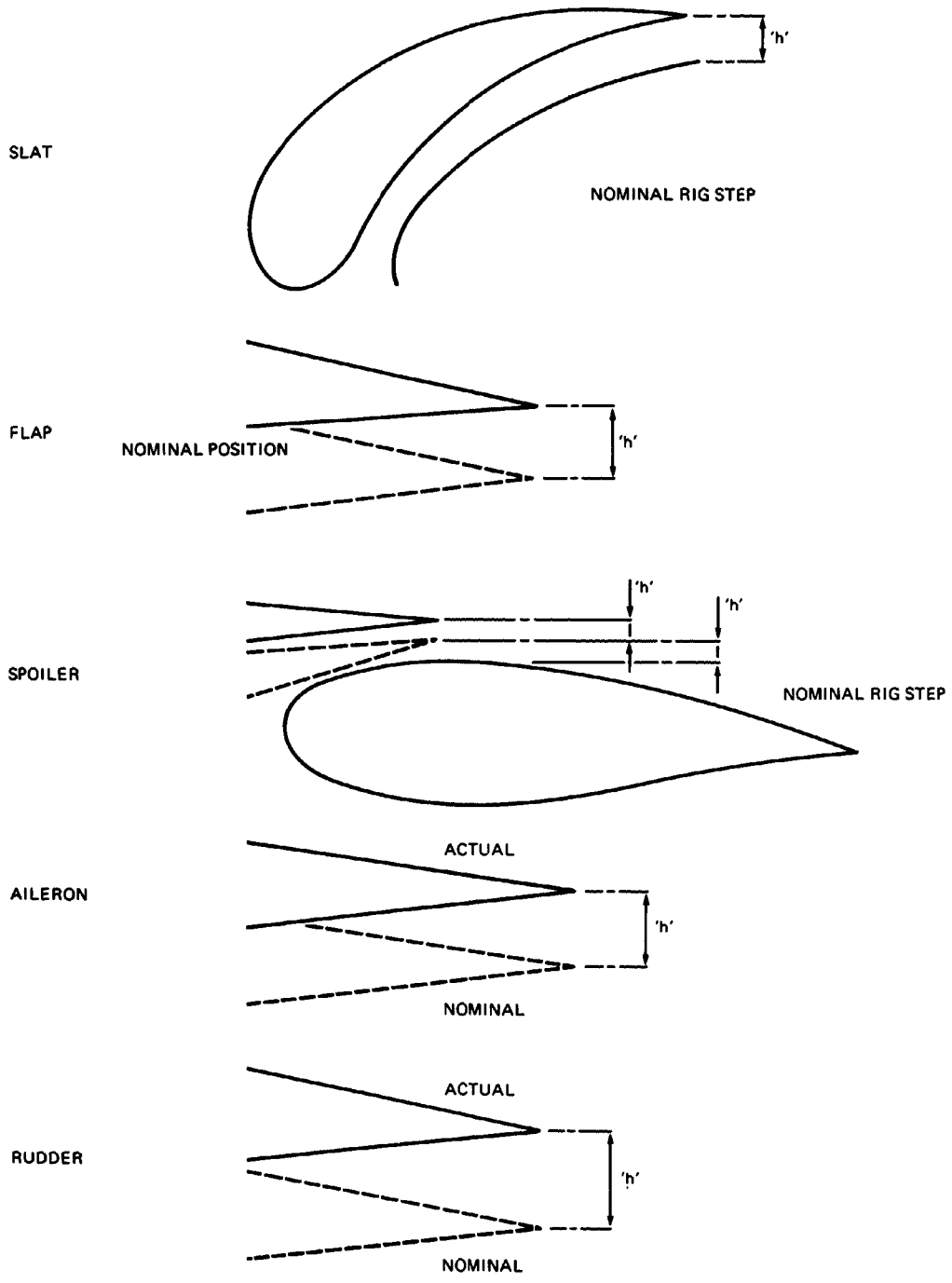
(2)Control Surfaces

(a)Make certain that control surfaces are correctly rigged, where possible, to optimum limits.

(b)Retractable control surfaces should be flush with external surface.

(c)Typical drag penalties in US gallons/year/meter length of mismatched or misrigged control surface (Ref. Fig. 604).

Control Surface	US gal/yr		
	Uniform Step height		
	5 mm	10 mm	15 mm
Slat (nominal rigged step)	3535	5630	7604
Flap Trailing Edge Step (nominal position)	875	1505	1950
Spoiler/Airbrake (nominal rigged step)	1930	4335	6655
All Speed Aileron (misrigged or mistrimmed)	875	1495	1970
Rudder (misrigged or mistrimmed	1000	1760	2265



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Control Surfaces
Figure 604

(3)Doors
  (a)Make certain that doors are correctly adjusted, where possible to optimum limits.
  (b)Check that exterior control handles are correctly adjusted and flush with external surface.
  (c)Typical drag penalties in US gallons/year/meter length of door mismatch.

ITEM	FUSELAGE LOCATION	US gal/yr	
		5 mm step	10 mm step
FWD Passenger Door	Section 12	1315	3040
Nose Gear Door	Section 12	1220	2765
FWD Cargo Door	Section 13	1315	2995
Emergency Exit Door	Section 15	550	1285
AFT Passenger Door	Section 18	420	970
Main Gear Door	Section 15	760	2010
AFT Cargo Door	Section 17	700	1630
BULK Cargo Door	Section 17	460	1180
Inspection Door	Section 19	470	1265
Manhole Door (values per door)	Wing Upper Surface	60 (1 mm step)	225 (3 mm step)

(4)Hinged Panels
  (a)Check that panels are flush with external surfaces.
  (b)Fasteners should be serviceable and not protrude into airflow.
  (c)Panel should be serviceable, not distorted, and gaps between exterior surface and panel not excessive.
  (d)Hinge line should be correctly adjusted where possible.
(5)Sliding Windows
  (a)Make certain that flight compartment sliding windows are correctly adjusted (Ref. 56-12-00, P. Block 401).
(6)Fairings
  (a)Fairings should be correctly installed and exterior surfaces smooth.
  (b)Seals should be correctly compressed and not protrude into airflow.
  (c)Skin offset should be correct and fairing should be shimmed where necessary.

E. Drag Reduction - Repair
(1)Corrosion
(a)Remove corrosion, and repair any damage to external surface (Ref. 51-74-10, P. Block 801).
(2)Scratches, marks and dents
(a)Remove scratches, marks and dents from external surfaces (Ref. 51-73-10, P. Block 801).
(3)Delamination (Resin-Fiber Composites)
(a)Remove delaminated component and repair or replace.
(4)Leading and trailing edges
(a)Leading and trailing edges should not be distorted or damaged.
(5)Skin joints (mismatch)
(a)Where possible, skin repairs should be flush with exterior surface.
(b)Skin repairs that project into the airflow should have chamfered edges where possible and if necessary a sealant fillet.
(c)Typical drag penalties in US gallons/year/meter length skin mismatch (Ref. Fig. 603).

ITEM	STEP FORM	US gal/yr							
		ZONE 1				ZONE 2			
		INTO WIND STEP IN MM		OUT OF WIND STEP IN MM		INTO WIND STEP IN MM		OUT OF WIND STEP IN MM	
		2	5	2	5	2	5	2	5
Fuselage Surfaces	Simple	148	502	74	221	89	303	46	137
	Chamfered	37	151	45	193	22	91	28	120
	Rounded	31	131	61	199	19	77	38	123
Wing Surface (Upper)	Simple	436	1454	436	1454	Divide Zone 1 Values by 1.7			
	Chamfered	373	1243	462	1541				
	Rounded	295	982	376	1253				
Wing Surface (Lower)	Simple	83	207	60	149	Same Values as Zone 1			
	Chamfered	26	64	64	159				
	Rounded	13	33	52	128				
Tail Surfaces	Simple	208	655	93	270	Divide Zone 1 Values by 1.5			
	Chamfered	54	196	56	243				
	Rounded	42	164	73	243				

REPLENISHING

1. General

This section provides all pertinent data for accomplishment of replenishing operations.

The operations are classified as follows :

- 12-11-00 Fuels
- 12-12-00 Hydraulic Fluids
- 12-13-00 Oil (Filling and Topping Up)
- 12-14-00 Gas
- 12-15-00 Potable water System - Water
- 12-16-00 Toilet Sanitary Fluid

WARNING : DURING ACCOMPLISHMENT OF REPLENISHING OPERATIONS SAFETY PRECAUTIONS MUST BE STRICTLY ADHERED TO.

1. General

Refer to 20-31-00, for details of types of fuel that may be used.

WARNING : BEFORE ALLOWING A FUEL TANKER TO APPROACH WITHIN A RADIUS OF 60 m (200 ft) OF THE AIRCRAFT NOSE, MAKE SURE THAT THE WEATHER RADAR IS SWITCHED OFF.

LANDING GEAR - MAKE SURE THAT THE GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE SURE THAT THE GROUND SAFETIES AND NOTICES ARE IN POSITION.

OBEY THE SAFETY PRECAUTIONS IN 28-00-00, P. BLOCK 301.

MAKE SURE THAT THE FIRE FIGHTING EQUIPMENT IS AVAILABLE AND ADEQUATE.

MAKE SURE THAT YOU ISOLATE THE ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS.

MAKE SURE THAT THE AIRCRAFT PARKING BRAKE IS ON.

BEFORE YOU CONNECT THE TANKER REFUELING HOSE TO THE AIRCRAFT, MAKE SURE THAT THE TANKER AND THE AIRCRAFT ARE CORRECTLY CONNECTED TO AN APPROVED GROUND. MAKE SURE THAT THE ELECTRICAL BONDING BETWEEN THE AIRCRAFT AND THE TANKER, AND THE AIRCRAFT AND THE HOSE IS EFFECTED (REF. 24-00-00, P. BLOCK 301).

R BONDING IS MANDATORY, FOR GROUNDING YOU MUST OBEY THE LOCAL AREA
R REGULATIONS.

DO NOT SPILL FUEL ON THE ENGINES OR THE BRAKES. IF YOU SPILL FUEL ON ENGINES OR BRAKES THAT ARE HOT, IT CAN CAUSE FIRES.

DO NOT OPERATE THE MICROPHONE BUTTONS ON HF TRANSMISSION DURING REFUELING/DEFUELING OR GROUND MAINTENANCE - FUEL TRANSFER OPERATIONS. IF YOU EMIT WITH THE HF SYSTEM DURING AIRCRAFT REFUELING YOU CAN CAUSE INJURY AND/OR START A FIRE.

WHEN YOU REFUEL THE AIRCRAFT THE WEIGHT OF THE FUEL MAY CAUSE SUDDEN AND POSSIBLY ASSYMETRICAL COMPRESSION OF THE SHOCK STRUTS ON BOTH THE MAIN GEAR AND THE NOSE GEAR ASSEMBLIES. THE AREA BELOW THE FUSELAGE AND THE WINGS MUST BE KEPT CLEAR.

AVIATION FLUIDS ARE FLAMMABLE. SMOKING IS NOT PERMITTED WHEN HANDLING AVIATION FLUIDS.

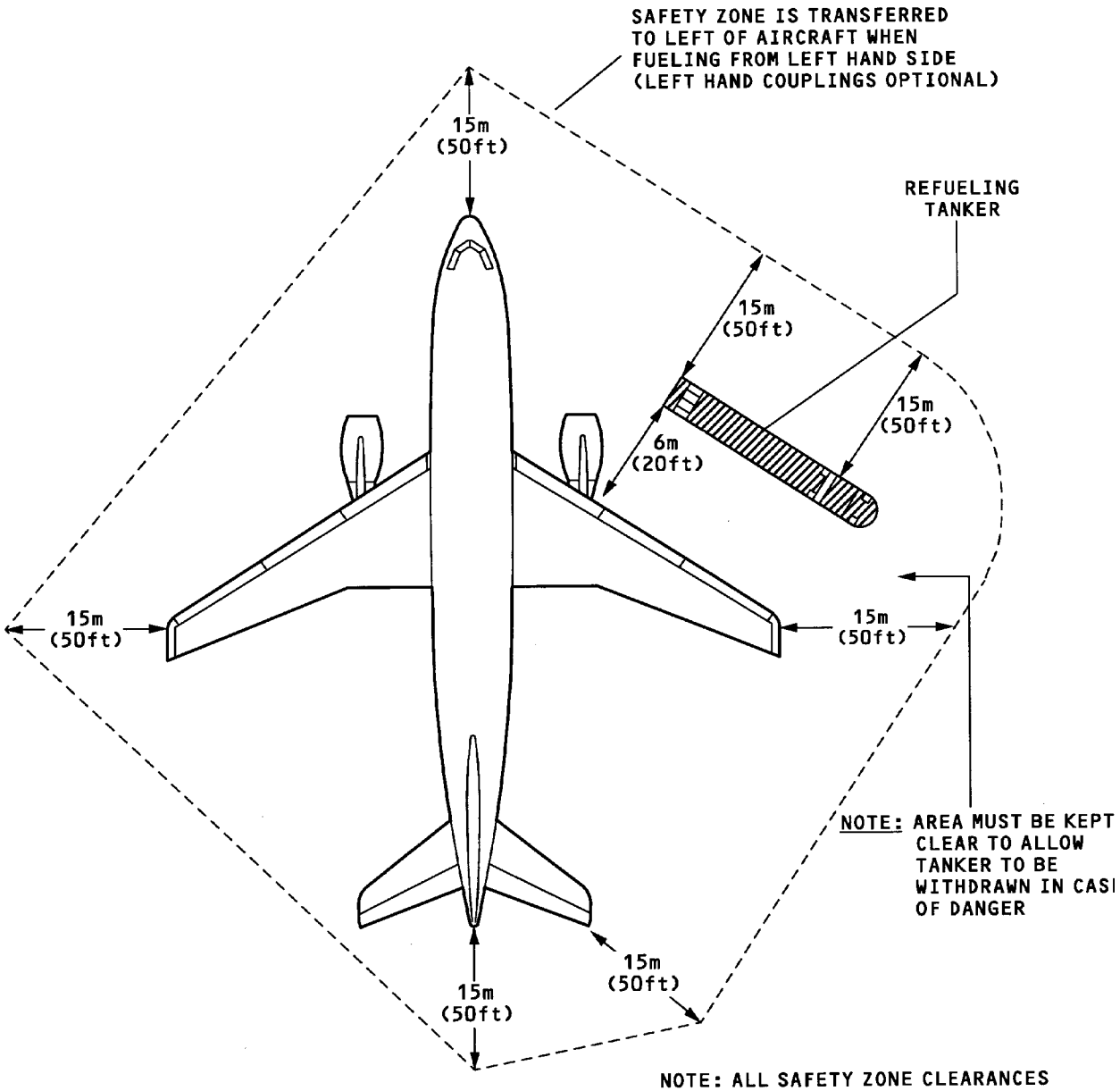
AVIATION FUEL IS POISONOUS. DO NOT GET AVIATION FUEL IN YOUR MOUTH OR IN YOUR EYES. REMOVE AVIATION FUEL SPLASHES FROM YOUR SKIN BY WASHING AS SOON AS POSSIBLE. DO NOT WEAR CLOTHING CONTAMINATED WITH AVIATION FUEL.

DO NOT PUT RAGS SOAKED WITH AVAITION FUEL INTO THE POCKETS BUT PUT

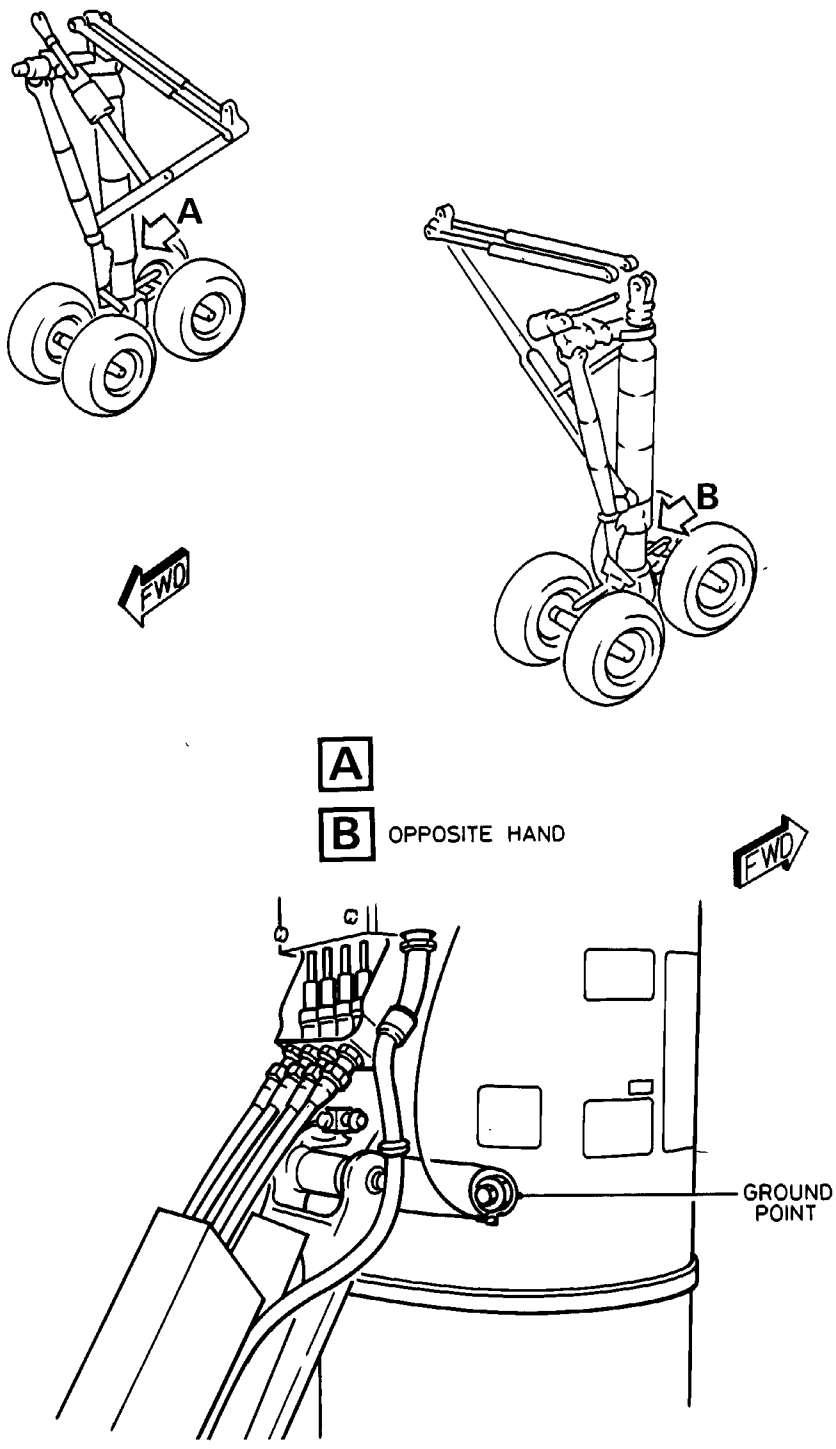
THEM IN THE FIREPROOF CONTAINER PROVIDED. DO NOT USE ANY AVIATION FUEL FOR CLEANING.

CAUTION : YOU MUST NOT REFUEL THE AIRCRAFT WHEN THE AIRCRAFT IS ON JACKS (REF. 07-11-00, P. BLOCK 1).

YOU MUST OBEY THE AIRCRAFT STABILITY PRECAUTIONS (REF. 05-57-00, OR 05-57-11, P. BLOCK 1) BEFORE YOU TRANSFER FUEL FROM ONE TANK TO ANOTHER WHEN THE AIRCRAFT IS ON JACKS (REF. 07-11-00, P. BLOCK 1).



Refueling Safety Area
Figure 301



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Location of Grounding Points on Main Landing Gear
Figure 302

1. Reason for the Job

A. To refuel the aircraft by either pressure refueling or overwing (gravity) filling, in or out of the hangar.

2. Safety Precautions

A. Safety Area (Ref. Fig. 301).
(1)The perimeter of the safety area is in the form of a polygon with peaks extending approximately 15 meters (50 feet) out from a projection on the ground of the aircraft (nose, wings, tail).
(2)Procedures in the safety area:
(a)It is not permitted for unauthorized persons to enter the safety area.
(b)Do not perform work likely to create sparks or which entails use of electricity.
(c)Do not slide or drag metallic objects along the ground.
(d)Do not wear hearing aids or introduce other battery-operated apparatus.
(e)Do not use electrical test equipment which could cause sparks.
(f)Whenever a refueling safety path centerline is not indicated by a line painted on the ground, the tanker driver can determine the path to follow by keeping at least one vehicle width away from the aircraft.
(g)The fuel tanker must be correctly positioned in the safety area without undue maneuvering.
(h)The vehicle must be parked with its rear approximately six meters (20 feet) from the refuel/defuel couplings. This will allow access to the cargo door.
(j)The area around the tanker must be kept clear to allow the tanker to be withdrawn in case of danger.
(k)When refueling the aircraft at night make sure that the refueling safety area is adequately illuminated.
(3)Safety distance of 60 meters (200 feet) from the Aircraft:
(a)Stop the fuel tanker 60 meters (200 feet) from the aircraft nose while the weather radar operates.
(b)Do not operate the fuel tanker/pump unit until you stop the operation of the weather radar.
(4)Safety distance of 30 meters (100 feet) from the Aircraft:
(a)The aircraft must not be fueled/defueled within 30 meters (100 feet) of radar or HF radio equipment under test in the aircraft or ground installations.
(5)Safety distance of 15 meters (50 feet) from the Aircraft:(Ref. Fig. 301)
(a)Put "NO SMOKING" warning notices around the work area not less than 15 meters (50 feet) from the fueling/defueling equipment and aircraft tank vents.
(b)Do not connect electrical equipment to a power source less than 15 meters (50 feet) away, unless the power source has spark proof connectors.
(c)Fueling/Defueling areas must be sited to avoid bringing fueling/defueling equipment or aircraft fuel tank vents within 15 meters (50 feet) of any building other than those parts constructed for the purpose such as nose loaders, aerobridges etc.
(6)Safety distance of 6 meters (20 feet) from the Aircraft:(Ref. Fig. 301)

(a)Ground power units (GPU's) can be operated provided they are not less than 6 meters (20 feet) from the aircraft filling and venting points, hydrant valves or other fueling defueling equipment in use.
(b)Photographic flash bulbs or electronic flash equipment must not be used within 6 meters (20 feet) of the fueling/defueling equipment or any filling or venting points of the aircraft.
(c)Smoking and the use of naked lights is not permitted in the 6 meter (20 feet) safety zone. Radios, radio telephones (cell phones and mobile phones) and pagers, and the operation of switches on lighting systems other than the sealed types, are not permitted. Personnel who work within the fueling zone and those engaged in fueling must not carry matches or other means of ignition or wear foot-wear with exposed iron or steel studs, nails or tips.
(d)The fueling/defueling zone must be regarded as extending not less than 6 meters (20 feet) radially from the filling and venting points on the aircraft and the fueling/defueling equipment and, when applicable from the hydrant valve in use for refueling. When defueling is taking place the vehicle will be venting and will generate a zone radiating from the tank vent.

B. Fire Safety Precautions (Ref. Fig. 302)
(1)Static electricity grounding and bonding connections shall be made in the order that follows:
(a)Tanker-to-ground.
(b)Aircraft-to-ground.
(c)Tanker-to-aircraft.
(d)Refueling hose/nozzle-to-aircraft.

NOTE : Bonding is mandatory, for grounding you must obey the local area regulations.

NOTE : The bonding operation is for the electrical continuity between the aircraft and the fuel tanker.
The grounding operation is for the electrical continuity between the aircraft and the earth.

NOTE : Each main gear includes an aircraft-to-fuel-tanker static electricity ground connector. This connector is located on shock strut at the upper-torque-link attachment point. Connectors must be perfectly clean and correctly hooked-up to obtain maximum efficiency.

(2)During the refuel/defuel procedure do not fill the oxygen system.
(3)Do not operate the aircraft main engines during a refuel/defuel procedure.

NOTE : In an operational emergency it is permitted to refuel with one engine running (Ref. FCOM).

(4)Refueling must not be attempted during a heavy storm.
(5)Make sure that fully serviceable fire fighting equipment is available.

(6)Only essential aircraft electrical services are to be operated.
(7)Immediately flush away with water, or remove, fuel leakage.
(8)APU starts or shutdowns are permitted during refuel/defuel procedures.
If it is necessary to operate the APU, the limits that follow apply:
(a)An APU start is not permitted during refuel/defuel procedure if the APU has failed to start or an automatic shutdown has occurred.
(b)You must complete a normal APU shutdown if a fuel spill has occurred during the refuel/defuel procedure.
(9)During storm conditions, or where there is atmospheric electrical activity, stop refueling/defueling operations:
(Ref. 20-17-00, P. Block 301).

C. General Technical Safety Precautions.

(1)The refueling pressure must not exceed 3.45 bar (50 psi).
(2)Make sure that you refuel the wing tanks and the center tank before you refuel the trim tank.
(3)Before you refuel, make sure that the chocks are in this position:
(a)If the ramp does not slope:
- move the aft NLG chocks away from the tires. During the refuel, the NLG tires will roll aft as the MLG shock absorber compresses
- make sure that the chocks do not touch the MLG tires. The weight of the fuel can lower the aircraft and cause the tires to catch the chocks.

(b)If the ramp slopes:
- make sure that all the chocks down from the tires touch the NLG and the MLG tires
- make sure that all the chocks up from the tires do not touch the NLG and the MLG tires.

**ON A/C 001-100,

D. Requirements for Fuel Additives
(1)For General Electric power plants refer to G.E. specification D50 TF2 latest issue.

**ON A/C 101-200,

D. Requirements for Fuel Additives
(1)For Pratt and Whitney power plants refer to PWA service bulletin No. 2016 latest issue.

**ON A/C ALL

3. General Information

**ON A/C 001-100,

(Ref. Fig. 303)

QUANTITY	USABLE FUEL	UNDRAINABLE FUEL	THERMAL EXPANSION
OUTER TANKS			
LITERS	7400	16	148
US GALLONS	1955	4	39
INNER TANKS			
LITERS	27900	50	558
US GALLONS	7371	13	147
CENTER TANK			
LITERS	19640	18	393
US GALLONS	5189	5	104
TRIM TANK			
LITERS	6150	40	123
US GALLONS	1625	11	32
ALL TANKS + FUEL LINES			
LITERS	61090	188	
US GALLONS	16140	50	
FUEL LINES	INCLUDED IN TANKS		
LITERS		64	
US GALLONS		17	

BM8 12 11 28 3 AHRO 03

Fuel System Refueling Chart
Figure 303

R EFFECTIVITY: 001-100,

PIA

Printed in France

**ON A/C 101-200,

(Ref. Fig. 304)

**ON A/C 101-200,

Post SB 28-2105 For A/C 101-200,

(Ref. Fig. 305)

**ON A/C 001-100,

A. Capacities
(1)Refer to the Refueling Chart for the maximum total fuel capacity (all tanks and fuel lines), the individual tank capacities and the fuel states that follow:
(a)**USABLE FUEL** - Is the maximum fuel load of the aircraft less the fuel quantity at the bottom of the tanks that cannot be delivered to the engines.
(b)**UNDRAINABLE FUEL** - A quantity of fuel at the bottom of the tanks which cannot be delivered to the engines or drained through the water drain valves.
(c)**THERMAL EXPANSION VOLUME** - The volume of fuel between the high level shut off volume, with the aircraft on level ground, and the volume at which the fuel overflows into the vent tank.
(2)During automatic refueling all tanks can receive fuel simultaneously. Tanks become full in the order: outers, inners, center, and trim tank. When manually refueling, the tanks are filled: outers, inners, center and trim tank.
(3)With the tanks filled to the Total Fuel quantities given in the Refueling Chart, there is sufficient room in each tank to allow a 2% thermal expansion of fuel without spillage through the vent system.
(4)The capacity in the vent tanks is:
- in each wing : 190 liters (50.2 US gal.)
- in trim tank : 160 liters (42.3 US gal.).
(5)If necessary during refueling procedures, close relevant refuel/defuel valve(s) to isolate associated tank(s) as required.

**ON A/C 101-200,

A. Capacities
(1)Refer to the Refueling Chart for the maximum total fuel capacity (all tanks and fuel lines), the individual tank capacities and the fuel states that follow:
(a)**USABLE FUEL** - Is the maximum fuel load of the aircraft less the fuel quantity at the bottom of the tanks that cannot be delivered to the engines.

QUANTITY	USABLE FUEL	UNDRAINABLE FUEL	THERMAL EXPANSION
OUTER TANKS			
LITERS	7400	16	148
US GALLONS	1955	4	39
INNER TANKS			
LITERS	27900	50	558
US GALLONS	7371	13	147
CENTER TANK			
LITERS	19640	18	393
US GALLONS	5189	5	104
TRIM TANK			
LITERS	6150	40	123
US GALLONS	1625	11	32
1 ACT			
LITERS	7200	17	144
US GALLONS	1902	4	38
ALL TANKS + FUEL LINES			
LITERS	68290	205	
US GALLONS	18042	54	
FUEL LINES	INCLUDED IN TANKS		
LITERS		64	
US GALLONS		17	

BM8 12 11 28 3 THMO 02

Fuel System Refueling Chart
Figure 304

R EFFECTIVITY: 101-200,

PIA

Printed in France

QUANTITY	USABLE FUEL	UNDRAINABLE FUEL	THERMAL EXPANSION
OUTER TANKS			
LITERS	7400	16	148
US GALLONS	1955	4	39
INNER TANKS			
LITERS	27900	50	558
US GALLONS	7371	13	147
CENTER TANK			
LITERS	19640	18	393
US GALLONS	5189	5	104
TRIM TANK			
LITERS	6150	40	123
US GALLONS	1625	11	32
2 ACT			
LITERS	14400	34	288
US GALLONS	3804	9	76
ALL TANKS + FUEL LINES			
LITERS	75490	222	
US GALLONS	19944	59	
FUEL LINES	INCLUDED IN TANKS		
LITERS		64	
US GALLONS		17	

BM8 12 11 28 3 THPO 02

Fuel System Refueling Chart
Figure 305

R EFFECTIVITY: 101-200,

PIA

(b)UNDRAINABLE FUEL - A quantity of fuel at the bottom of the tanks which cannot be delivered to the engines or drained through the water drain valves.
(c)THERMAL EXPANSION VOLUME - The volume of fuel between the high level shut off volume, with the aircraft on level ground, and the volume at which the fuel overflows into the vent tank.
(2)During automatic refueling all tanks can receive fuel simultaneously. Tanks become full in the order: outers, inners, center, ACT (if fitted) and trim tank.
When manually refueling, the tanks are filled: outers, inners, center, ACT (if fitted) and trim tank.
(3)With the tanks filled to the Total Fuel quantities given in the Refueling Chart, there is sufficient room in each tank to allow a 2% thermal expansion of fuel without spillage through the vent system.
(4)The capacities of the vent tanks are:
- in each wing : 50.2 US gal (190 liters)
- in trim tank : 42.3 US gal (160 liters).
(5)If necessary during refueling procedures, close relevant refuel/defuel valve(s) to isolate associated tank(s) as required.

**ON A/C 101-200,

Post SB 28-2105 For A/C 101-200,

A. Capacities
(1)Refer to the Refuelling Chart for the maximum total fuel capacity (all tanks and fuel lines), the individual tank capacities and the fuel states that follow:
(a)USABLE FUEL - Is the maximum fuel load of the aircraft less the fuel quantity at the bottom of the tanks that cannot be delivered to the engines.
(b)UNDRAINABLE FUEL - A quantity of fuel at the bottom of the tanks which cannot be delivered to the engines or drained through the water drain valves.
(c)THERMAL EXPANSION VOLUME - The volume of fuel between the high level shut off volume, with the aircraft on level ground, and the volume at which the fuel overflows into the vent tank.
(2)During automatic refueling, all tanks can receive fuel simultaneously. Tanks become full in the order: outers, inners, center, ACT(s) (if fitted) and trim tank. When manually refueling, the tanks are filled: outers, inners, center, ACT(s) (if fitted) and trim tank.
(3)With the tanks filled to the Total Fuel quantities given in the Refueling Chart, there is sufficient room in each tank to allow a 2% thermal expansion of fuel without spillage through the vent system.
(4)The capacities of the vent tanks are:
- in each wing : 190 liters (50.2 US gal.)
- in trim tank : 160 liters (42.3 US gal.).
(5)If necessary during refueling procedures, close relevant refuel/defuel valve(s) to isolate associated tank(s) as required.

**ON A/C ALL

4. Not applicable.

5. Automatic Refueling

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 13 ft (4 m)
B.	Tanker Capable of 50 psi (3.45 bar) Delivery
C.	Warning Notices - NO SMOKING
Referenced Procedures	
- 05-57-00, P. Block 1	Aircraft Stability
- 05-57-11, P. Block 1	Aircraft Stability
- 07-11-00, P. Block 1	Jacking For Aircraft Maintenance
- 12-31-28, P. Block 201	Cold Weather Maintenance - Fuel
- 24-00-00, P. Block 301	Electrical Power - General
- 24-23-00, P. Block 301	Auxiliary AC Generation
- 24-31-00, P. Block 1	Batteries - DC Generation
- 24-41-00, P. Block 301	AC External Power Control
- 28-00-00, P. Block 301	Fuel - General
- 28-42-38, P. Block 501	Fuel Quantity Computer (15QT)
- 31-46-11, P. Block 401	Center of Gravity Control Computer (1GU)

B. Job Set-Up

CAUTION : WHEN YOU MUST OPERATE THE REFUEL/DEFUEL PANEL 110VU, IN AMBIENT TEMPERATURES BELOW -40 DEG. C. (-40 DEG. F.), REFER TO THE PROCEDURE FOR THE PREPARATION FOR OPERATION OF THE REFUEL/DEFUEL PANEL 110VU, -40 DEG. C. (-40 DEG. F.) (REF. 12-31-28, P. Block 201).

(Ref. Fig. 306)

**ON A/C 001-100,

(Ref. Fig. 307)

**ON A/C 101-200,

(Ref. Fig. 308)

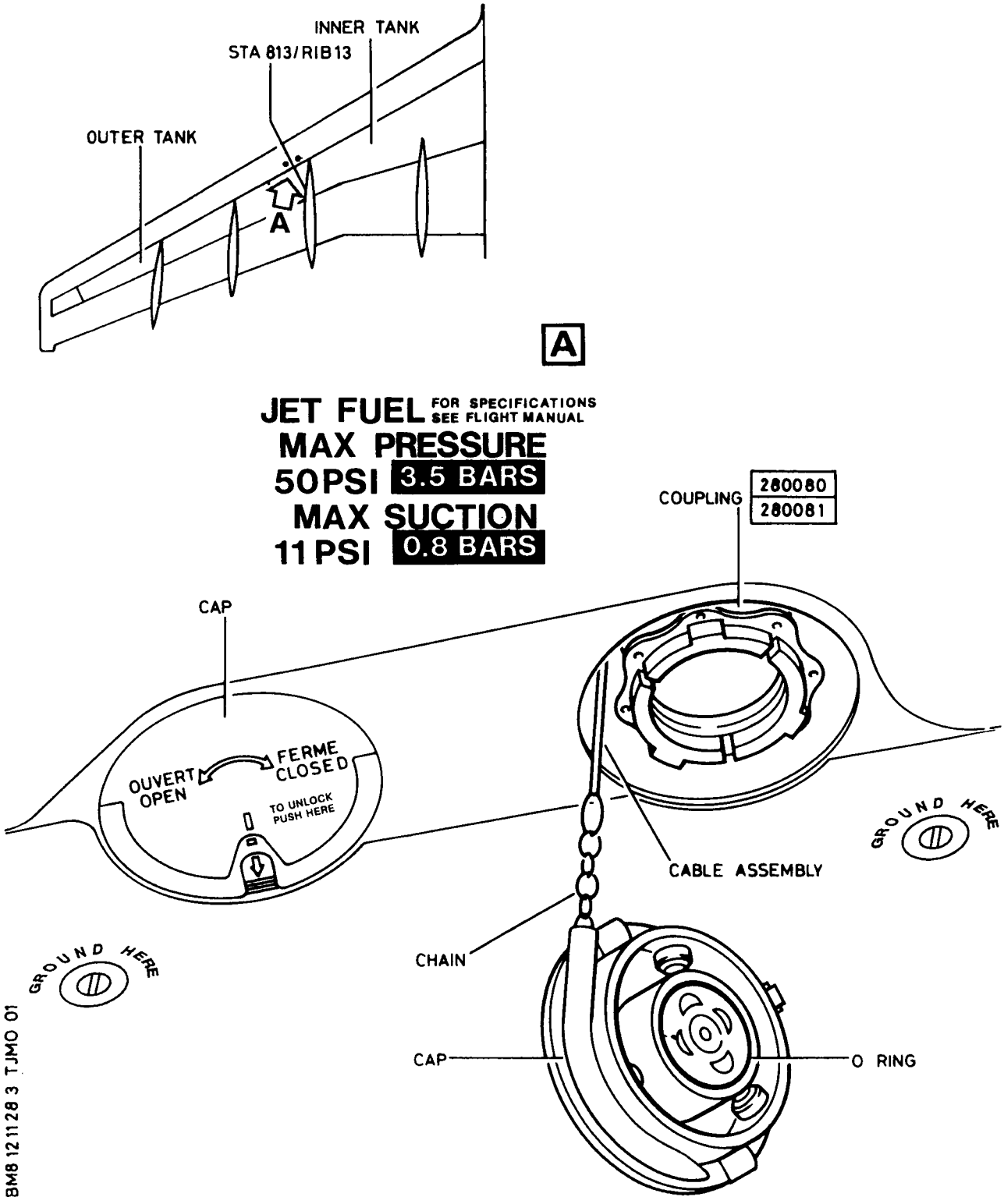
**ON A/C 101-200,

Post SB 28-2108 For A/C 101-200,

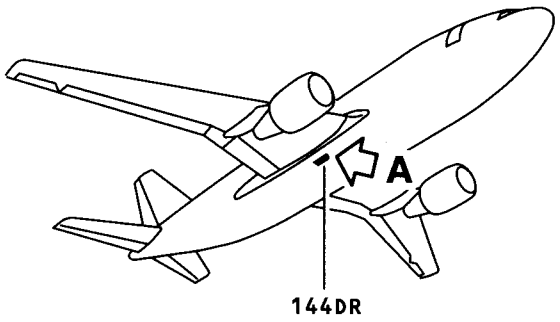
(Ref. Fig. 309)

**ON A/C ALL

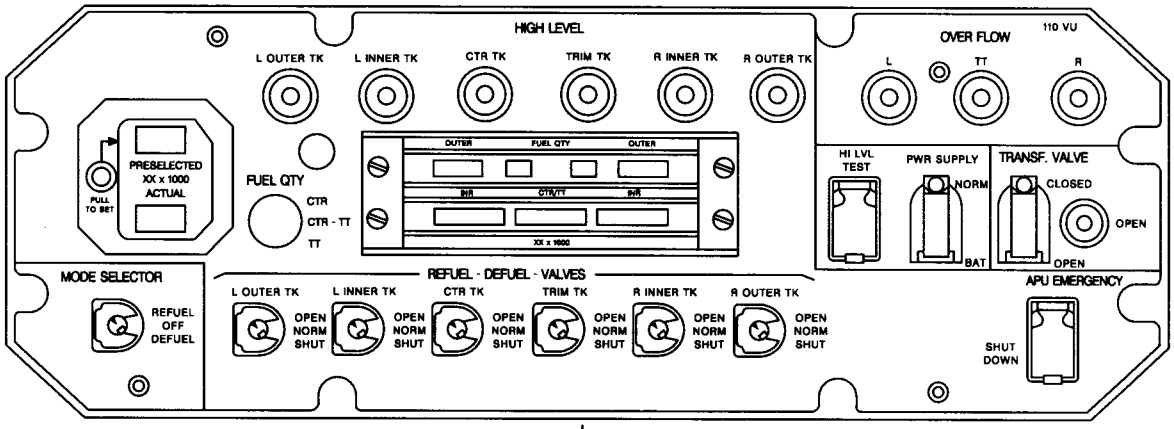
(1)Not applicable.
(2)Position the warning notices at the perimeter of the safety area.



Refuel/Defuel Couplings
Figure 306



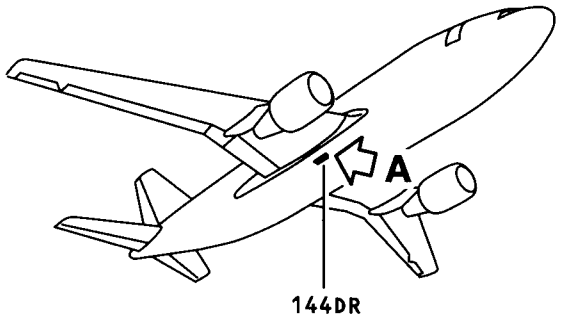
A

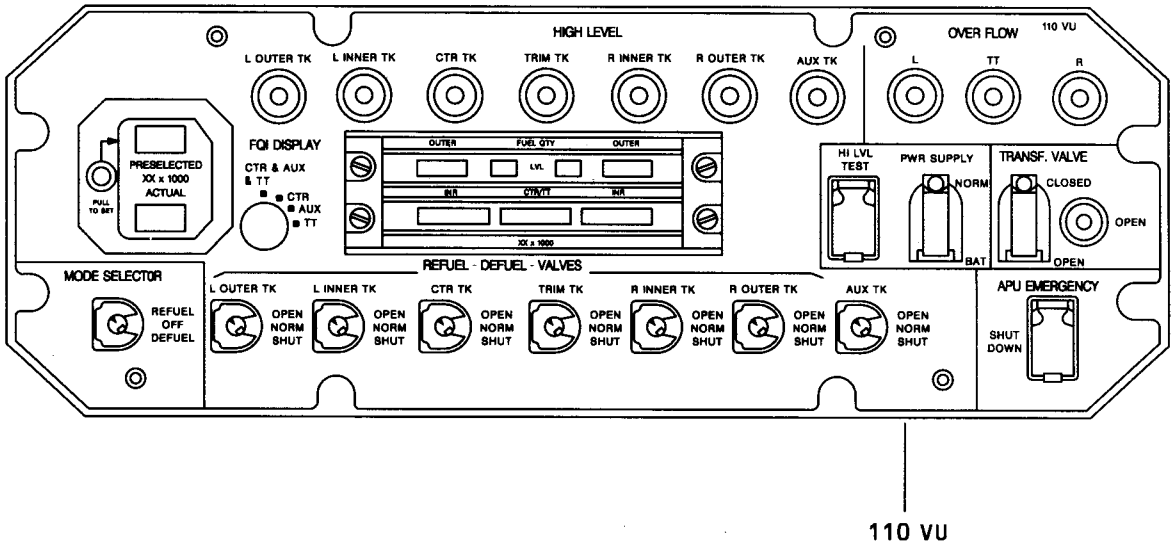


110 VU

BM8 12 11 28 3 QJM0 01

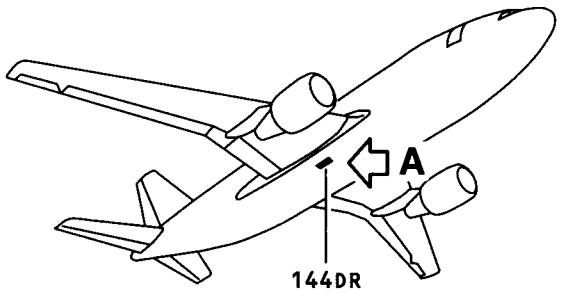
External Refuel Panel
Figure 307

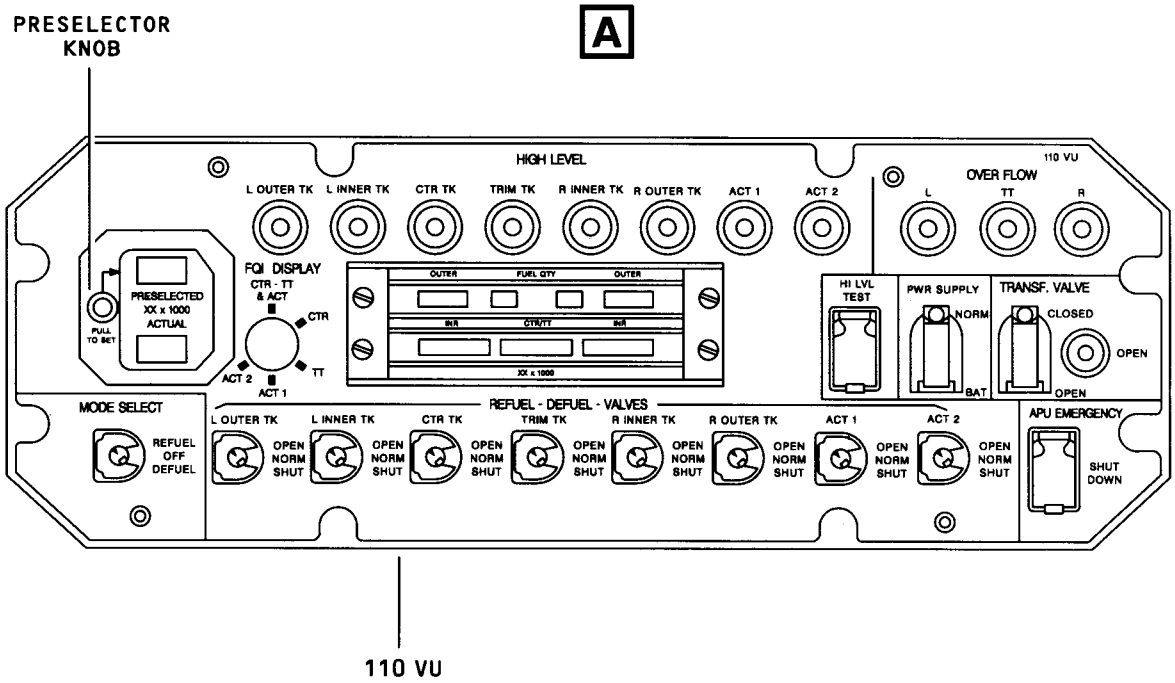




BM8 12 11 28 3 TKM0 01

External Refuel Panel
Figure 308





BM8 12 11 28 3 QKMO 00

External Refuel Panel
Figure 309

(3)Position the tanker on the safety path centerline adjacent to the refuel/defuel couplings.

CAUTION: DO NOT POSITION THE ACCESS PLATFORM UNDER THE WING.

(4)Put the access platform in position for access to the refuel/defuel couplings in zone 623 on the RH wing, STA813 (RIB 13).

WARNING : TO PREVENT ANY POSSIBILITY OF STATIC ELECTRICITY DISCHARGE WHICH MAY CAUSE FIRE OR EXPLOSION, THE AIRCRAFT AND THE TANKER MUST BE CORRECTLY BONDED.

(5)Observe the relevant safety precautions and make static electricity grounding and bonding connections in the following order:

R NOTE : Bonding is mandatory, for grounding you must obey the local area
R regulations.

(a)Make sure that the tanker is connected to approved ground.
(b)Make sure that the aircraft ground cable is securely connected to one of the grounding points located on the main landing gear legs upper torque link attachment point.
(c)Connect the bonding cable from the tanker to the aircraft.
(d)Before removing the refuel/defuel coupling cap(s) insert the hose bonding cable pin(s) into the grounding point(s) near the coupling(s).

(6)Remove the aircraft refuel/defuel coupling cap(s). The cap(s) remain suspended by chains.

WARNING : MAKE SURE THAT THE FUEL SUPPLY HOSE IS CORRECTLY CONNECTED TO THE COUPLING BEFORE YOU REFUEL/DEFUEL THE AIRCRAFT. DO NOT CONNECT THE FUEL SUPPLY HOSE IF THERE ARE SIGNS OF DAMAGE TO THE AIRCRAFT COUPLING LUGS OR SLOTS.

CAUTION : ON AIRCRAFT WITH REFUEL/DEFUEL COUPLINGS ON EACH WING, A MAXIMUM OF TWO HOSES MAY BE CONNECTED AT ANY ONE TIME.

(7)Connect the fuel supply hose(s) to the aircraft refuel/defuel couplings.
(8)Make sure that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
132VU	FUEL/FUELLING/XFR & VALVE	2QU	321/P55
132VU	FUEL/FUELLING/CTL & REFUEL VALVE	1QU	321/P56
132VU	FUEL/FUELLING/HI LVL	6QJ	321/P57
132VU	FUEL/FUELLING/OVERFLOW & CAL	5QJ	321/P58
132VU	FUEL/FQI/SUPPLY & IND	1QT	321/P59
132VU	FUEL/FQI/CHAN SUPPLY/1	3QT	321/P60
132VU	FUEL/FQI/CHAN SUPPLY/2	4QT	321/P61

(9)Make sure that the TRIM TK MODE P/BSW on the overhead panel 430VU is released (out) to the AUTO position. If the TRIM TK MODE P/BSW is

pressed (in) to the FWD position, refueling of the trim tank is prevented which may lead to fuel spillage.

CAUTION: DO NOT CLOSE THE ACCESS DOOR 144DR OR OPERATE THE ACCESS DOOR MICROSWITCH UNTIL REFUELING IS COMPLETE.

(10)Open the access door 144DR to the refuel/defuel panel 110VU.
(11)If external electrical power is to be used:
(a)On panel 110VU, make sure that the PWR SUPPLY switch is set to NORM and guarded.
(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(12)If external power is not to be used:
(a)Using aircraft batteries (Ref. 24-31-00, P. Block 1):

NOTE : For this operation it is unnecessary to select aircraft batteries ON.

- on panel 110VU, raise the guard and place the PWR SUPPLY switch in BAT position.

(b)Using the APU generator to supply aircraft electrical network:
- energize the aircraft electrical network (Ref.24-23-00, P. Block 301).
- make sure that the electronics racks are ventilated (Ref. 24-41-00, P. Block 301).
- on panel 110VU, make sure that the PWR SUPPLY switch is in the NORM position and guarded.

C. Procedure

R (1)Do step 1. of the Functional Test - Fuel Quantity Computer (15QT) (Ref. 28-42-38, P. Block 501).

R NOTE : When you do this procedure, it is not necessary to do step 2. of the Functional Test - Fuel Quantity Computer (15QT) (Ref. 28-42-38, P. Block 501).

R (2)The FQI can display incorrect fuel quantities. You must do the checks that follow each time you refuel the aircraft, to check for FQI over-read.
R If there are signs of FQI over-read, you can still refuel the aircraft.
R On panel 110VU:
R (a)Check the fuel quantity in the trim tank on the FUEL QTY indicator as follows:
R 1 Put the FUEL QTY/FQI DISPLAY switch in the TT position:
R - if the fuel quantity is less than 200 kg (440 lb), then continue with step (b)
R - if the fuel quantity is 200 kg (440 lb) or more, then transfer all the fuel to the center tank (Ref. 28-25-00, P. Block 301).
R (b)Check the fuel quantity in the center tank on the FUEL QTY indicator as follows:
R 1 Put the FUEL QTY/FQI DISPLAY switch in the CTR position.
R 2 If the fuel quantity is less than 3000 kg (6614 lb), then continue

R with step (c).
R 3 If the fuel quantity is 3000 kg (6614 lb) or more, then use the
R center tank magnetic level indicator (MLI) to check the fuel
R quantity again (Ref. Para. 9.):
R - if the difference in the fuel quantity between the FUEL QTY
R indicator and the MLI in the center tank is less than 1000 kg
R (2205 lb), then continue with step (c)
R - if the difference in the fuel quantity between the FUEL QTY
R indicator and the MLI in the center tank is more than 1000 kg
R (2205 lb), then make a record in the Aircraft Technical Log of the
R fuel quantity in the center tank. Continue with step (c).
R (c)Check the fuel quantities in the left and right inner tanks on the
R FUEL QTY indicator as follows:
R 1 If the difference in the fuel quantities between the left and right
R inner tanks is less than 5000 kg (11023 lb), then continue with the
R refueling procedure.
R 2 If the difference in the fuel quantities between the left and right
R inner tanks is more than 5000 kg (11023 lb), use the MLI's in the
R inner tanks to check the fuel quantity in each inner tank again
R (Ref. Para. 9.):
R - if the difference in the fuel quantity between the FUEL QTY
R indicator and the MLI's is less than 1000 kg (2205 lb) in each
R inner tank, then continue with the refueling procedure
R - if the difference in the fuel quantity between the FUEL QTY
R indicator and the MLI's is more than 1000 kg (2205 lb) in one or
R both inner tanks, then make a record in the Aircraft Technical Log
R of the fuel quantities in the left and right inner tanks.

R **ON A/C 001-100,

R 3 Put the FUEL QTY switch to the CTR & TT position.
R (d)Continue with the procedure reference step (3).

R **ON A/C 101-200,

R 3 Put the FQI DISPLAY switch in the CTR & AUX & TT position.
R (d)Continue with the procedure reference step (3).

R **ON A/C 101-200,

R Post SB 28-2108 For A/C 101-200,

R 3 Put the FQI DISPLAY switch in the CTR-TT & ACT position.
R (d)Continue with the procedure reference step (3).

R **ON A/C ALL

R (3)Not applicable
R (4)Not applicable
R (5)Continue with the procedure. On panel 110VU:

R (a)Make sure that all the REFUEL-DEFUEL-VALVES switches are in the NORM
R and guarded position.
R (b)Make sure that the TRANSF. VALVE switch is in the CLOSED and guarded
R position, and that the OPEN indicator light is off.
R (c)Pull (out) the preselector knob and turn it to set the required fuel
R quantity.

R NOTE : The PRESELECTED quantity display will continue to increase
R or decrease for up to 0.7 seconds after rotation of the
R preselector knob ceases.
R When the preselector knob is pulled (out), the ACTUAL contents
R display will go off.

R (d)Push (in) the preselector knob.
R (e)Lift the guard and put the MODE SELECTOR/SELECT switch in the REFUEL
R position.

R NOTE : A delay of up to 10 seconds may occur before the refuel/defuel
R valves are energized open.
R The fuel quantity indicators may show dashes in the least
R significant digit on the inner tanks only, until one minute
R after fuel flow starts.

R CAUTION : THE MAXIMUM REFUELING PRESSURE IS 50 psi (3.45 bar).
R WHEN YOU REFUEL, CLOSELY MONITOR THE APPLICABLE FUEL QUANTITY,
R HIGH LEVEL LIGHTS AND OVERFLOW LIGHTS ON PANEL 110VU. IF THE L,
R R OR TT OVERFLOW LIGHTS COME ON, PUT THE MODE SELECTOR/SELECT
R SWITCH TO THE OFF POSITION AND STOP REFUELING IMMEDIATELY.

R (6)Not applicable.
R (7)Start refueling.

CAUTION: WHEN REFUELING, WITH THE APU IN USE, FUEL CONSUMPTION FROM
THE OUTER TANKS IS ALLOWED UNTIL THE INNER TANK HAS RECEIVED
ENOUGH FUEL TO FEED THE APU. AFTER THIS, FUEL CONSUMPTION FROM
THE OUTER TANKS IS NOT ALLOWED.

**ON A/C 001-100,

NOTE: Total time to fill wing tanks is approximately 19 minutes.
Total time to fill all tanks is approximately 28 minutes.

**ON A/C 101-200,

NOTE: Total time to fill wing tanks is approximately 19 minutes.
Total time to fill wing, center and trim tanks is approximately
27 minutes.

Total time to fill wing, center, ACT and trim tanks is

approximately 36 minutes.

**ON A/C 101-200,

Post SB 28-2105 For A/C 101-200,

NOTE: Total time to fill wing tanks is approximately 19 minutes.
Total time to fill wing, center and trim tanks is approximately 27 minutes.
Total time to fill wing, center, ACT 1 and trim tanks is approximately 36 minutes.

Total time to fill wing, center, ACT 1, trim tank and ACT 2 is approximately 60 minutes.

**ON A/C ALL

Shortly before preselected quantity is reached, fuel flow will stop for approximately 10 seconds, then restart.

R (8)After refueling, on panel 110VU:
(a)Make sure that the ACTUAL quantity is within 100 kg of the PRESELECTED quantity.

**ON A/C 001-100,

(b)Place the FUEL QTY switch in the CTR position, then the TT position
R and make sure that the distribution of fuel in the center and trim tanks is correct.
(c)Place the FUEL QTY switch to the CTR & TT position.

**ON A/C 101-200,

(b)Place the FQI DISPLAY switch in the CTR position, then the AUX
R position (if ACT installed) and then the TT position. Make sure that
R the distribution of fuel in the center tank, ACT (if installed) and
R the trim tank is correct.
(c)Place the FQI DISPLAY switch in the CTR & AUX & TT position.

**ON A/C 101-200,

R

R Post SB 28-2108 For A/C 101-200,

(b)Place the FQI DISPLAY switch in the CTR position, then the TT position

R then the ACT 1 position (if installed) and then the ACT 2 position (if
R installed). Make sure that the distribution of fuel in the center
R tank, ACT 1 (if installed), trim tank and ACT 2 (if installed) is
R correct.
(c)Place the FQI DISPLAY switch in the CTR-TT & ACT position.

**ON A/C ALL

R (d)Make sure that the HIGH LEVEL light is on for any tank that has been
R fully refueled.
R (e)If the outer tanks are not fully refueled and the inner, center and
R trim tanks are empty, then do these steps:
R 1 Use the MLI's to check the fuel quantity in the outer tanks again
R (Ref. Para. 9.).
R 2 Make a record in the Aircraft Technical Log of the fuel quantity in
R each outer tank.
R (f)Put the MODE SELECTOR/SELECT switch in the OFF and guarded position.
R (g)If applicable put the PWR SUPPLY switch in the NORM and guarded
R position.

D. Close-Up
(1)Close access door 144DR.
(2)De-energize the aircraft electrical network (Ref. 24-41-00,
P. Block 301 or 24-31-00, P. Block 1 or 24-23-00, P. Block 301).
(3)Remove the static electricity grounding and bonding connections in the
following order:
(a)Disconnect the refueling hose(s) and replace the refuel/defuel
coupling cap(s).

NOTE: If the refuel/defuel coupling is damaged, it is permissible
for the aircraft to fly without the coupling cap installed; no
fuel leakage is allowed. Refer to the Configuration Deviation
List (CDL).

(b)Remove the refueling hose(s) bonding cable pin(s) from the coupling
grounding point(s).
(c)Disconnect the tanker bonding cable from the aircraft.
(d)If no longer required disconnect the aircraft and tanker earthground
cable(s) (if applicable).
(4)Remove the access platform.
(5)Remove the warning notices.

6. Manual Pressure Refueling with Aircraft Electrical Network Energized

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 13 ft (4 m)
B.	Tanker, Capable of 50 psi (3.45 bar)
C.	Warning Notices - NO SMOKING
Referenced Procedures	
- 05-57-00, P. Block 1	Aircraft Stability
- 05-57-11, P. Block 1	Aircraft Stability
- 07-11-00, P. Block 1	Jacking For Aircraft Maintenance
- 12-31-28, P. Block 201	Cold Weather Maintenance - Fuel
- 24-00-00, P. Block 301	Electrical Power - General
- 24-23-00, P. Block 301	Auxiliary AC Generation
- 24-31-00, P. Block 1	Batteries - DC Generation
- 24-41-00, P. Block 301	AC External Power Control
- 28-00-00, P. Block 301	Fuel - General
- 28-42-38, P. Block 501	Fuel Quantity Computer (15QT)
- 31-46-11, P. Block 401	Center of Gravity Control Computer (1GU)

B. Job Set-Up

CAUTION : WHEN YOU MUST OPERATE THE REFUEL/DEFUEL PANEL 110VU, IN AMBIENT TEMPERATURES BELOW -40 DEG. C. (-40 DEG. F.), REFER TO THE PROCEDURE FOR THE PREPARATION FOR OPERATION OF THE REFUEL/DEFUEL PANEL 110VU, -40 DEG. C. (-40 DEG. F.) (REF. 12-31-28, P. Block 201).

**ON A/C 001-100,

(Ref. Fig. 307)

**ON A/C 101-200,

(Ref. Fig. 308)

**ON A/C 101-200,

Post SB 28-2108 For A/C 101-200,

(Ref. Fig. 309)

**ON A/C ALL

(Ref. Fig. 306)
(1)Not applicable.
(2)Observe the safety precautions as for refueling (Ref. Para. 2.).

(3)Position the warning notices at the perimeter of the safety area.

CAUTION : THE AREA AROUND THE TANKER MUST BE KEPT CLEAR TO ALLOW THE TANKER TO BE WITHDRAWN IN CASE OF DANGER.

(4)Position the tanker adjacent to the refuel/defuel couplings.

WARNING : TO PREVENT ANY POSSIBILITY OF STATIC ELECTRICITY DISCHARGE WHICH MAY CAUSE FIRE OR EXPLOSION, THE AIRCRAFT AND THE TANKER MUST BE CORRECTLY BONDED.

(5)Observe the relevant safety precautions and make static electricity grounding and bonding connections in the following order:

NOTE : Bonding is mandatory, for grounding you must obey the local area regulations.

(a)Make sure that the tanker is connected to an approved ground.
(b)Make sure that the aircraft ground cable is securely connected to one of the grounding points located on the main landing gear leg(s) upper torque link attachment point.
(c)Connect the bonding cable from the tanker to the aircraft.

CAUTION: DO NOT POSITION THE ACCESS PLATFORM UNDER THE WING.

(6)Put the access platform in position for access to the refuel/defuel couplings in zone 623 on the RH wing, STA813 (RIB 13).

(7)Before removing the refuel/defuel coupling caps, insert the refueling hose bonding cable pin into the grounding point near the coupling(s).
(8)Remove the refuel/defuel coupling cap(s). The cap(s) remain suspended by chains.

WARNING : MAKE SURE THAT THE FUEL SUPPLY HOSE IS CORRECTLY CONNECTED TO THE COUPLING BEFORE YOU REFUEL/DEFUEL THE AIRCRAFT. DO NOT CONNECT THE FUEL SUPPLY HOSE IF THERE ARE SIGNS OF DAMAGE TO THE AIRCRAFT COUPLING LUGS OR SLOTS.

CAUTION : ON AIRCRAFT WITH REFUEL/DEFUEL COUPLINGS ON EACH WING, A MAXIMUM OF TWO HOSES MAY BE CONNECTED AT ANY ONE TIME.

(9)Connect the fuel supply hose(s) to the aircraft refuel/defuel couplings.
(10)Make sure that the TRIM TK MODE P/BSW on the overhead panel 430VU is released (out) to the AUTO position. If the TRIM TK MODE P/BSW is pressed (in) to the FWD position, refueling of the trim tank is prevented. This may lead to fuel spillage.
(11)Make sure that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
132VU	FUEL/FQI		Line 321
132VU	FUEL/FUELLING		Line 321

CAUTION: DO NOT CLOSE ACCESS DOOR 144DR OR OPERATE ACCESS DOOR MICROSWITCH UNTIL REFUELING IS COMPLETE.

(12)Open the access door 144DR to the refuel/defuel panel 110VU.
(13)If external electrical power is to be used:
(a)On panel 110VU, make certain that PWR SUPPLY switch is in NORM position and guarded.
(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(14)If external power is not to be used:
(a)Using aircraft batteries (Ref. 24-31-00, P. Block 1).

NOTE: For this operation it is not necessary to select aircraft batteries ON.

- on panel 110VU, raise the guard and place the PWR SUPPLY switch in BAT position.

(b)Using the APU generator to supply aircraft electrical network:
- energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) and make certain that electronics racks are ventilated (Ref. 24-41-00, P. Block 301).
- on panel 110VU, make certain that PWR SUPPLY switch is in NORM position and guarded.

C. Procedure

WARNING: FOLLOW THE AIRCRAFT STABILITY PRECAUTIONS REF. 05-57-11, P. BLOCK 1, WHILE REARWARD FUEL TRANSFER TO THE TRIM TANK IS TAKING PLACE

R (1)Do step 1. of the Functional Test - Fuel Quantity Computer (15QT) (Ref. 28-42-38, P. Block 501).

R NOTE : When you do this procedure, it is not necessary to do step 2. of the Functional Test - Fuel Quantity Computer (15QT) (Ref. 28-42-38, P. Block 501).

R (2)The FQI can display incorrect fuel quantities. You must do the checks that follow each time you refuel the aircraft, to check for FQI over-read.
R If there are signs of FQI over-read, you can still refuel the aircraft.
R On panel 110VU:
R (a)Check the fuel quantity in the trim tank on the FUEL QTY indicator as follows:
R 1 Put the FUEL QTY/FQI DISPLAY switch in the TT position:
R - if the fuel quantity is less than 200 kg (440 lb), then continue with step (b)
R - if the fuel quantity is 200 kg (440 lb) or more, then transfer all the fuel to the center tank (Ref. 28-25-00, P. Block 301).
R (b)Check the fuel quantity in the center tank on the FUEL QTY indicator as follows:

R 1 Put the FUEL QTY/FQI DISPLAY switch in the CTR position.
R 2 If the fuel quantity is less than 3000 kg (6614 lb), then continue with step (c).
R 3 If the fuel quantity is 3000 kg (6614 lb) or more, then use the center tank magnetic level indicator (MLI) to check the fuel quantity again (Ref. Para. 9.):
R - if the difference in the fuel quantity between the FUEL QTY indicator and the MLI in the center tank is less than 1000 kg (2205 lb), then continue with step (c)
R - if the difference in the fuel quantity between the FUEL QTY indicator and the MLI in the center tank is more than 1000 kg (2205 lb), then make a record in the Aircraft Technical Log of the fuel quantity in the center tank. Continue with step (c).
R (c)Check the fuel quantities in the left and right inner tanks on the FUEL QTY indicator as follows:
R 1 If the difference in the fuel quantities between the left and right inner tanks is less than 5000 kg (11023 lb), then continue with the refueling procedure.
R 2 If the difference in the fuel quantities between the left and right inner tanks is more than 5000 kg (11023 lb), use the MLI's in the inner tanks to check the fuel quantity in each inner tank again (Ref. Para. 9.):
R - if the difference in the fuel quantity between the FUEL QTY indicator and the MLI's is less than 1000 kg (2205 lb) in each inner tank, then continue with the refueling procedure
R - if the difference in the fuel quantity between the FUEL QTY indicator and the MLI's is more than 1000 kg (2205 lb) in one or both inner tanks, then make a record in the Aircraft Technical Log of the fuel quantities in the left and right inner tanks.

R **ON A/C 001-100,

R 3 Put the FUEL QTY switch to the CTR & TT position.
R (d)Continue with the procedure reference step (3).

R **ON A/C 101-200,

R 3 Put the FQI DISPLAY switch in the CTR & AUX & TT position.
R (d)Continue with the procedure reference step (3).

R **ON A/C 101-200,

R Post SB 28-2108 For A/C 101-200,

R 3 Put the FQI DISPLAY switch in the CTR-TT & ACT position.
R (d)Continue with the procedure reference step (3).

R **ON A/C ALL

R (3)Not applicable

R (4)Not applicable
R (5)Continue with the procedure. On panel 110VU:
R (a)Raise the guards and put all the REFUEL-DEFUEL-VALVES switches in the SHUT position.
R (b)Make sure that the TRANSF. VALVE switch is in the CLOSED and guarded position, and that the OPEN indicator light is off.
R (c)Raise the guard and put the MODE SELECTOR/SELECT switch in the REFUEL position.

R NOTE : The fuel quantity indicators may show dashes in the least significant digit on the inner tanks only, until one minute after fuel flow begins.

R (d)Put the appropriate tank REFUEL-DEFUEL-VALVES switch(es) in the OPEN position.

R NOTE : Trim tank cannot be refueled until either, both inner tanks are at high level or the center tank refuel/defuel valve is open.

CAUTION : WHEN YOU REFUEL, CLOSELY MONITOR THE APPLICABLE FUEL QUANTITY, HIGH LEVEL LIGHTS AND OVERFLOW LIGHTS ON PANEL 110VU. IF L, R, R OR TT OVERFLOW LIGHTS COME ON, PUT THE MODE SELECTOR/SELECT R SWITCH TO THE OFF POSITION AND STOP REFUELING IMMEDIATELY.

R (6)Start refueling.

CAUTION : THE MAXIMUM REFUELING PRESSURE IS 50 psi (3.45 bar).

CAUTION: WHEN REFUELING, WITH THE APU IN USE, FUEL CONSUMPTION FROM THE OUTER TANKS IS ALLOWED UNTIL THE INNER TANK HAS RECEIVED ENOUGH FUEL TO FEED THE APU. AFTER THIS, FUEL CONSUMPTION FROM THE OUTER TANKS IS NOT ALLOWED.

R (7)On panel 110VU:
(a)Monitor individual tank contents of FUEL QTY indicator.

**ON A/C 001-100,

NOTE: Individual fuel quantities in center and trim tank can be displayed by holding FUEL QTY switch in either CTR position or TT position.

**ON A/C 101-200,

NOTE: Individual fuel quantites in center, ACT (if fitted) and trim tanks can be displayed by placing FQI DISPLAY switch first in CTR position, then AUX (if ACT fitted) position, and then TT

position. Make certain FQI DISPLAY switch is left in CTR & AUX & TT position for total quantity display.

**ON A/C 101-200,

Post SB 28-2105 For A/C 101-200,

NOTE: Individual fuel quantites in center, ACT(s) (if fitted) and trim tanks can be displayed by placing FQI DISPLAY switch first in CTR position, then TT position, then ACT 1 position (if fitted), and then ACT2 position (if fitted). Make certain FQ1 DISPLAY switch is left in CTR-TT & ACT position for total quantity display.

**ON A/C ALL

R (b)As tank contents reach the required level, put the appropriate tank
R REFUEL-DEFUEL-VALVES switch(es) in the SHUT position.

R NOTE : As tanks become full, fuel flow will be stopped by signals
R from the high level sensors. The appropriate tank HIGH LEVEL
R indicator light(s) will come on.

**ON A/C 001-100,

R (8)After refueling, on panel 110VU:
R (a)Hold the FUEL QTY switch in the CTR position and then the TT position.
R Make sure that the quantity of fuel in the center tank and trim tank
R is correct.
R (b)Put the FUEL QTY switch in the CTR & TT position.
R (c)Make sure that the HIGH LEVEL light is on for any tank that has been
R fully refueled.
R (d)If the outer tanks are not fully refueled and the inner, center and
R trim tanks are empty, then do these steps:
R 1 Use the MLI's to check the fuel quantity in the outer tanks again
R (Ref. Para. 9.).
R 2 Make a record in the Aircraft Technical Log of the fuel quantity in
R each outer tank.
R (e)Put the MODE SELECTOR switch in the OFF and guarded position.
R (f)Put all the REFUEL-DEFUEL-VALVES switches in the NORM and guarded
R position.
R (g)If applicable, put the PWR SUPPLY switch in the NORM and guarded
R position.

D. Close-Up

**ON A/C 101-200,

R (8)After refueling - on panel 110VU:
R (a)Put the FQI DISPLAY switch first in the CTR position, then the AUX
R position (if ACT installed) and then the TT position. Make sure that
R the quantity of fuel in the center tank, ACT (if installed) and trim
R tank is correct.
R (b)Put the FQI DISPLAY switch in the CTR and AUX & TT position.
R (c)Make sure that the HIGH LEVEL light is on for any tank that has been
R fully refueled.
R (d)If the outer tanks are not fully refueled and the inner, center and
R trim tanks are empty, then do these steps:
R 1 Use the MLI's to check the fuel quantity in the outer tanks again
R (Ref. Para. 9.).
R 2 Make a record in the Aircraft Technical Log of the fuel quantity in
R each outer tank.
R (e)Put the MODE SELECTOR switch in the OFF and guarded position.
R (f)Put all the REFUEL-DEFUEL-VALVES switches in the NORM and guarded
R position.
R (g)If applicable, put the PWR SUPPLY switch in the NORM and guarded
R position.

D. Close-Up

**ON A/C 101-200,

Post SB 28-2105 For A/C 101-200,

R Post SB 28-2108 For A/C 101-200,

R (8)After refueling - on panel 110VU:
(a)Put the FQI DISPLAY switch first in the CTR position, then the TT
position and then the ACT 1 position (if installed), and then the ACT
R 2 position (if installed). Make sure that the quantity of fuel in the
R center tank, ACT 1 (if installed), trim tank and ACT 2 (if installed)
R is correct.
(b)Put the FQI DISPLAY switch in the CTR-TT & ACT position.
R (c)Make sure that the HIGH LEVEL light is on for any tank that has been
R fully refueled.
R (d)If the outer tanks are not fully refueled and the inner, center and
R trim tanks are empty, then do these steps:
R 1 Use the MLI's to check the fuel quantity in the outer tanks again
R (Ref. Para. 9.).
R 2 Make a record in the Aircraft Technical Log of the fuel quantity in
R each outer tank.
R (e)Put the MODE SELECT switch in the OFF and guarded position.
R (f)Put all the REFUEL-DEFUEL-VALVES switches in the NORM and guarded
R position.

R (g)If applicable, put the PWR SUPPLY switch in the NORM and guarded
R position.

D. Close-Up

**ON A/C ALL

(1)Close access door 144DR.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301 or 24-31-00, P. Block 1 or 24-43-00, P. Block 301).
(3)Remove the static electricity grounding and bonding connections in the following order:
(a)Disconnect the refueling hose(s) and replace the refuel/defuel coupling cap(s).

NOTE: If the refuel/defuel coupling is damaged, it is permissible for the aircraft to fly without the coupling cap installed; no fuel leakage is allowed. Refer to the Configuration Deviation List (CDL).

(b)Remove the refueling hose(s) bonding cable pin(s) from the coupling grounding point(s).
(c)Disconnect the tanker bonding cable from the aircraft.
(d)If no longer required disconnect the aircraft and tanker earthground cable (if applicable).
(4)Remove the access platform.
(5)Remove the warning notices.

7. Manual Pressure Refueling with Aircraft Electrical Network De-energized

**ON A/C 101-200,

CAUTION : THE ACT(S) MUST NOT BE REFUELED WHEN THE AIRCRAFT ELECTRICAL SYSTEM IS DE-ENERGIZED.

**ON A/C ALL

NOTE : Refuel tanks individually.

NOTE : The trim tank cannot be refueled or defueled while the aircraft electrical network is de-energized.

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 8 ft (2.5 m)
B.	Access Platforms 13 ft (4 m)
C.	Tanker, Capable of 50 psi (3.45 bar)
D.	Warning Notices - NO SMOKING
Referenced Procedures	
- 05-57-00, P. Block 1	Aircraft Stability
- 05-57-11, P. Block 1	Aircraft Stability
- 07-11-00, P. Block 1	Jacking For Aircraft Maintenance
- 12-31-28, P. Block 201	Cold Weather Maintenance - Fuel
- 24-00-00, P. Block 301	Electrical Power - General
- 28-00-00, P. Block 301	Fuel - General
- 32-12-11, P. Block 301	Main Gear Main Door
- 31-46-11, P. Block 401	Center of Gravity Control Computer (1GU)

CAUTION : WHEN YOU MUST OPERATE THE REFUEL/DEFUEL PANEL 110VU, IN AMBIENT TEMPERATURES BELOW -40 DEG. C. (-40 DEG. F.), REFER TO THE PROCEDURE FOR THE PREPARATION FOR OPERATION OF THE REFUEL/DEFUEL PANEL 110VU, BELOW -40 DEG. C. (-40 DEG. F.) (REF. 12-31-28, P. Block 201).

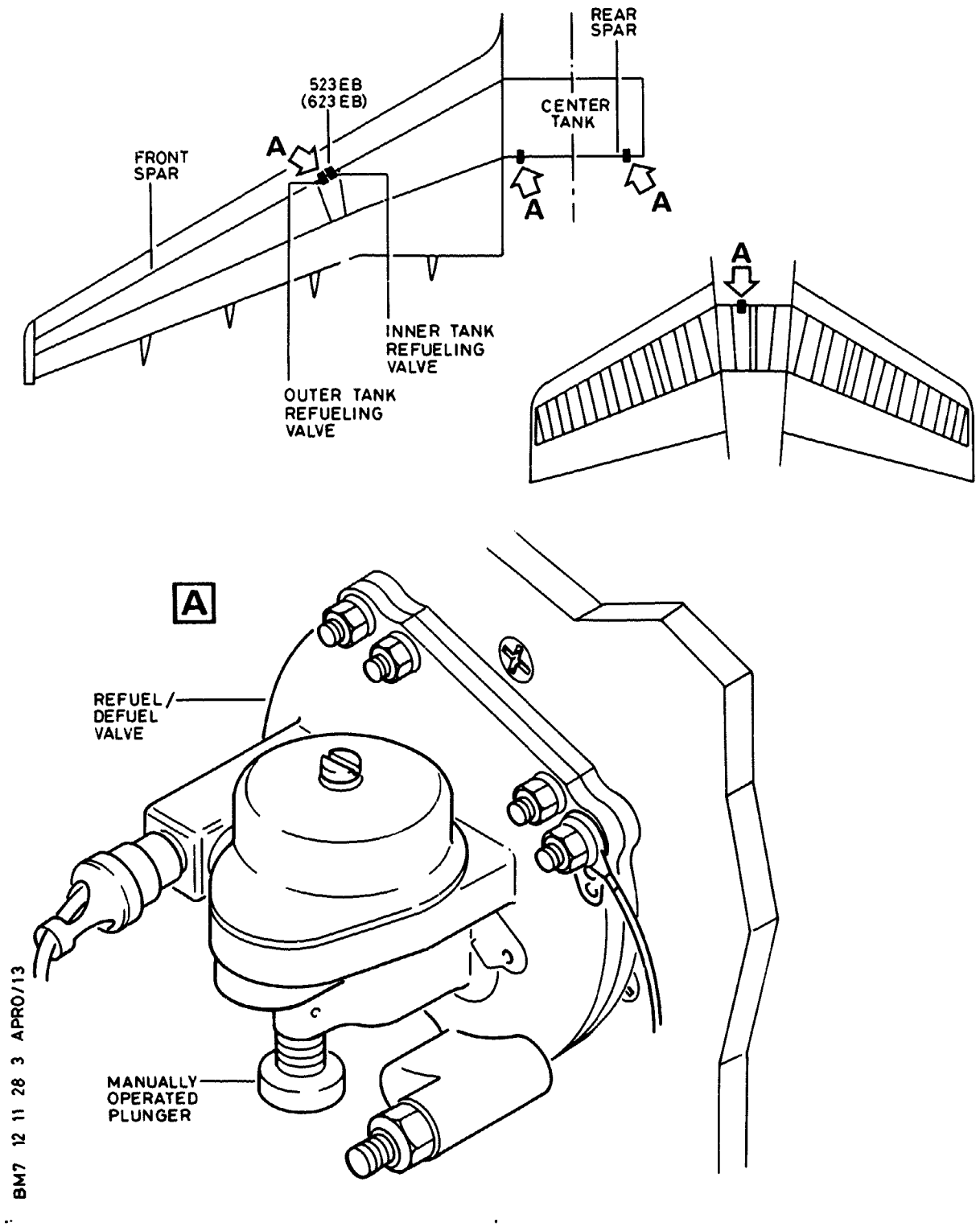
B. Job Set-Up
(1)Not applicable.

**ON A/C 001-100,

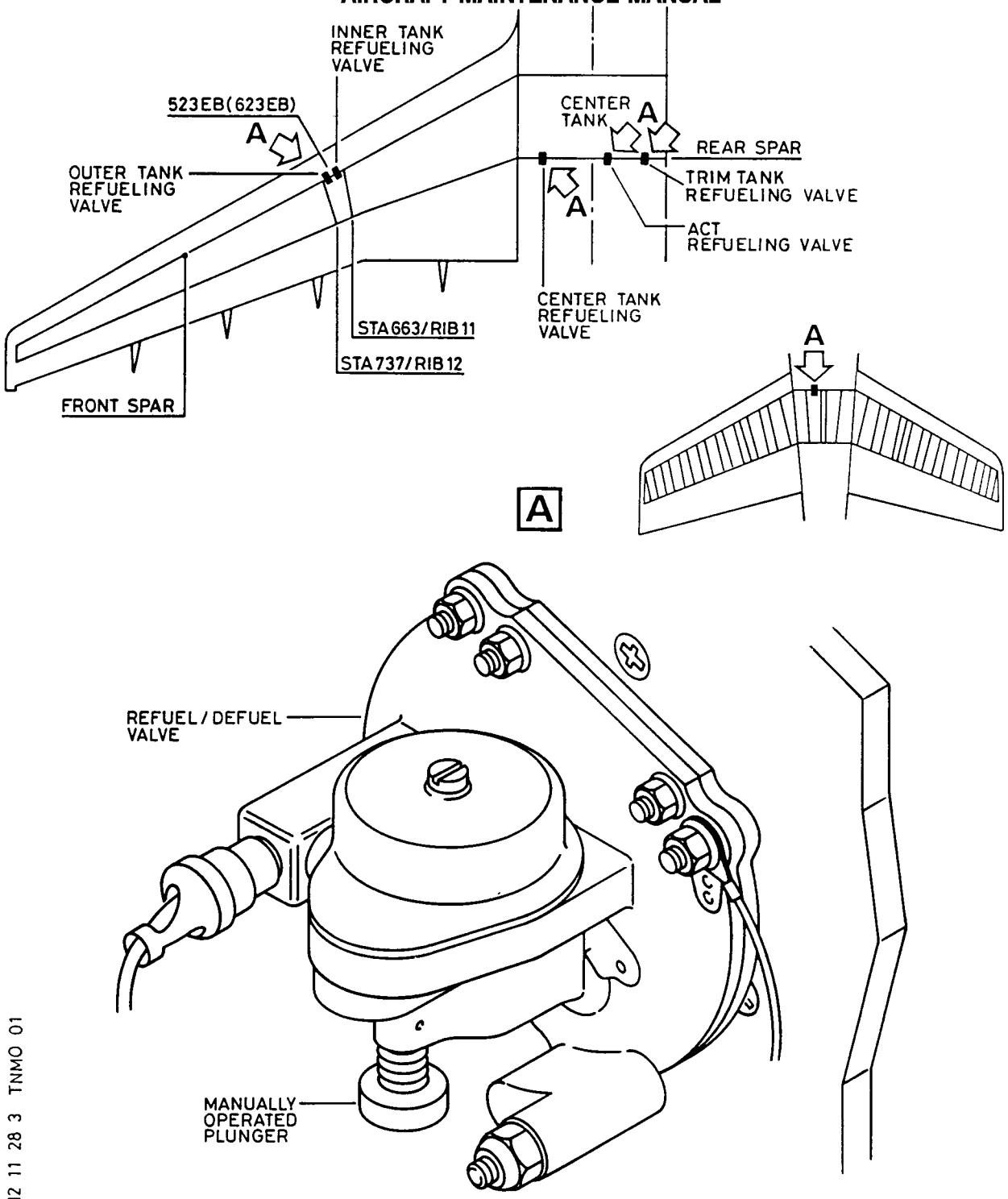
(Ref. Fig. 310)

**ON A/C 101-200,

(Ref. Fig. 311)



Refuel/Defuel Valves
Figure 310



Refuel/Defuel Valves
Figure 311

**ON A/C ALL

(2)Observe the safty precautions as for refueling (Ref. Para.2).
(3)Position the warning notices at the perimeter of the safety area.

CAUTION : THE AREA AROUND THE TANKER MUST BE KEPT CLEAR TO ALLOW THE TANKER TO BE WITHDRAWN IN CASE OF DANGER.

(4)Position the tanker adjacent to the refuel/defuel couplings.

WARNING : TO PREVENT ANY POSSIBILITY OF STATIC ELECTRICITY DISCHARGE WHICH MAY CAUSE FIRE OR EXPLOSION, THE AIRCRAFT AND THE TANKER MUST BE CORRECTLY BONDED.

(5)Observe the relevant safety precautions and make static electricity grounding and bonding connections in the following order:

NOTE : Bonding is mandatory, for grounding you must obey the local area regulations.

(a)Make sure that the tanker is connected to an approved earthground.
(b)Make sure that the aircraft earthground cable is securely connected to one of the grounding points located on the main landing gear leg(s) upper torque link attachment point(s).
(c)Connect the bonding cable from the tanker to the aircraft.

CAUTION : DO NOT POSITION THE ACCESS PLATFORM UNDER THE WING.

(6)Put the access platform in position for access to the refuel/defuel couplings in zone 623 on the RH wing, STA813 (RIB 13).
(7)Before removing the refuel/defuel coupling cap(s); insert the hose bonding cable pins into grounding point near couplings.
(8)Remove the refuel/defuel coupling cap(s). The caps remain suspended by chains.

WARNING : MAKE SURE THAT THE FUEL SUPPLY HOSE IS CORRECTLY CONNECTED TO THE COUPLING BEFORE YOU REFUEL/DEFUEL THE AIRCRAFT. DO NOT CONNECT THE FUEL SUPPLY HOSE IF THERE ARE SIGNS OF DAMAGE TO THE AIRCRAFT COUPLING LUGS OR SLOTS.

CAUTION : ON AIRCRAFT WITH REFUEL/DEFUEL COUPLINGS ON EACH WING, A MAXIMUM OF TWO HOSES MAY BE CONNECTED AT ANY ONE TIME.

(9)Connect the fuel supply hose(s) to the aircraft refuel/defuel couplings.

R

R (10)Before you refuel the aircraft you must calculate and record the total
R quantity of fuel that is in the fuel tanks:
R (a)Do the procedure 'Use of magnetic level indicators using tabular data'

(Ref. Para. 9.) to calculate the aircraft fuel load.
(b)For this refuel procedure the trim tank must be considered empty. Any fuel in the trim tank cannot be measured when the aircraft electrical network is de-energized.
(11)Make a decision about which fuel tanks you will refuel.

CAUTION : DO NOT POSITION THE ACCESS PLATFORM UNDER THE WING.

(12)Position the access platform 4 m (13 ft) at the refuel/defuel valves located between STA663 (RIB 11) and STA737 (RIB 12).
(13)For the inner and outer tanks:
- remove the access door 523 (623)EB.

(14)For the center tank:
- open the LH main landing gear door 734 (Ref. 32-12-11, P. Block 301)
- position the access platform.

C. Procedure

CAUTION : THE TANKS ARE TO BE REFUELED IN THE ORDER: OUTERS, INNERS AND CENTER.

(1)Push (in) and hold the manual control plunger(s) on the refuel/defuel valve(s) for the tank(s) to be filled (Ref. Table 301):

TANK	RE-DEFUEL VALVE IDENT.
L(R) outer	9 (10) QU
L(R) inner	11 (12) QU
Center	24 QU

Table 301

(2)Start refueling at the tanker and monitor the quantity of fuel delivered in the wing tanks and the center tank:
- at the flowmeter on the tanker
- on the MLI's (Ref. Para. 9).

NOTE: High level sensor cut-offs will not operate without electrical power.

(3)When you have filled the applicable fuel tanks with the required fuel quantity, release (out) the manual control plunger(s) on the related refuel/defuel valve(s).
(4)Stop refueling at the tanker.
(5)Do the procedure that follows when the aircraft electrical network is energized:

R (a)Open the access door 121BL.
R (b)On the rack 92VU, at the FQIC (15QT), push (in) and hold the RESET/
R MEMORY CLEAR P/BSW for five seconds.
R (c)Close the access door.

D. Close-Up
(1)Remove the static electricity grounding and bonding connections in the following order:
(a)Disconnect the refueling hose(s) and replace the refuel/defuel coupling cap(s).

NOTE: If the refuel/defuel coupling is damaged,it is permissible for the aircraft to fly without the coupling cap installed; no fuel leakage is allowed. Refer to the Configuration Deviation List (CDL).

(b)Remove the refueling hose(s) bonding cable pin(s) from coupling grounding point(s).
(c)Disconnect the tanker bonding cable from the aircraft.
(d)If no longer required disconnect the aircraft and tanker earthground cable(s) (if applicable).
(2)Close the access door 523(623)EB.
(3)Remove the access platform and close the LH main landing gear bay door (Ref. 32-12-11, P. Block 301).
(4)Remove all the other access platforms.
(5)Remove the warning notices.

8. Overwing (Gravity) Filling

NOTE: It is not possible to transfer fuel into the trim tank when overwing gravity filling.

**ON A/C 001-100,

NOTE: The inner and outer tanks may be gravity filled. The center tank is replenished by transferring fuel from the wing tanks using the aircraft transfer system (Ref. 28-25-00, P. Block 301).

**ON A/C 101-200,

NOTE: the inner and outer tanks may be gravity filled. The center tank and ACT(s) (if fitted) are replenished by transferring fuel from the wing tanks using the aircraft transfer system (Ref. 28-25-00, P. Block 301).

**ON A/C ALL

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 15 ft (4.5 m)
B.	Tanker with Gravity Filling Nozzle
C.	Warning Notices - NO SMOKING
Referenced Procedures	
- 05-57-00, P. Block 1	Aircraft Stability
- 05-57-11, P. Block 1	Aircraft Stability
- 07-11-00, P. Block 1	Jacking For Aircraft Maintenance
- 12-31-28, P. Block 201	Cold Weather Maintenance - Fuel
- 24-23-00, P. Block 301	Auxiliary AC Generation
- 24-31-00, P. Block 1	Batteries - DC Generation
- 24-41-00, P. Block 301	AC External Power Control
- 28-00-00, P. Block 301	Fuel - General
- 28-25-00, P. Block 301	Refuel/Defuel System
- 28-42-38, P. Block 501	Fuel Quantity Computer (15QT)
- 31-46-11, P. Block 401	Center of Gravity Control Computer (1GU)

B. Job Set-Up

CAUTION : WHEN YOU MUST OPERATE THE REFUEL/DEFUEL PANEL 110VU, IN AMBIENT TEMPERATURES BELOW -40 DEG. C. (-40 DEG. F.), REFER TO THE PROCEDURE FOR THE PREPARATION FOR OPERATION OF THE REFUEL/DEFUEL PANEL 110VU, BELOW -40 DEG. C. (-40 DEG. F.) (REF. 12-31-28,

P. Block 201).

(Ref. Fig. 312)
(1)Observe the safety precautions as for refueling (Ref. Para. 2)
(2)Position the warning notices at the perimeter of the safety area.

CAUTION : THE AREA AROUND THE TANKER MUST BE KEPT CLEAR TO ALLOW THE TANKER TO BE WITHDRAWN IN CASE OF DANGER.

(3)Position the tanker adjacent to the refuel/defuel couplings.

WARNING : TO PREVENT ANY POSSIBILITY OF STATIC ELECTRICITY DISCHARGE WHICH MAY CAUSE FIRE OR EXPLOSION, THE AIRCRAFT AND THE TANKER MUST BE CORRECTLY BONDED.

(4)Observe the relevant safety precautions and make static electricity grounding and bonding connections in the following order:

NOTE : Bonding is mandatory, for grounding you must obey the local area regulations.

(a)Make sure that the tanker is connected to an approved earthground.
(b)Make sure that the aircraft earthground cable is securely connected to one of the grounding points located on the main landing gear leg(s) upper torque link attachment point(s).
(c)Connect the bonding cable from the tanker to the aircraft.

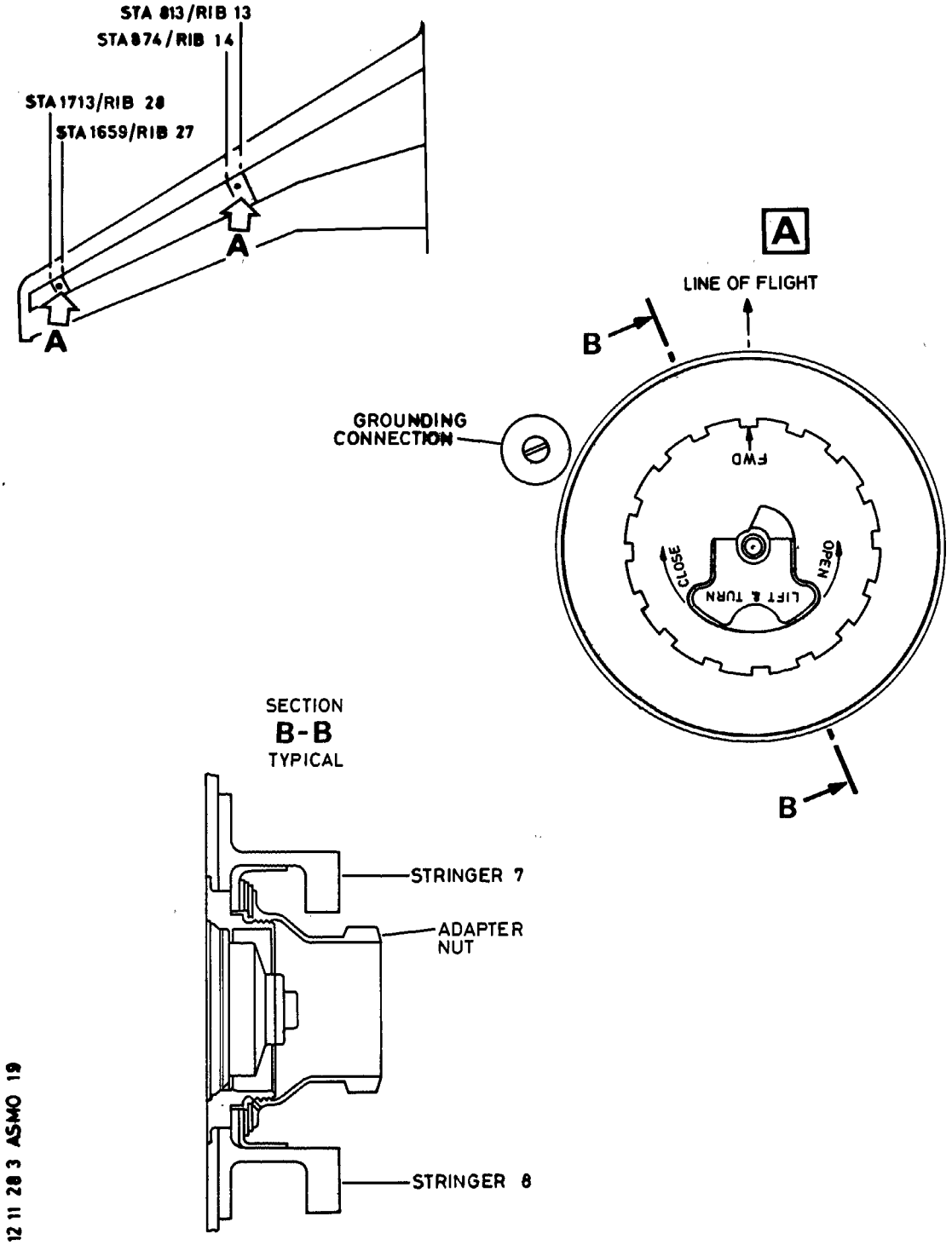
CAUTION : DO NOT POSITION ACCESS PLATFORM UNDER WING.

(5)Position access platform(s) for access to overwing refueling caps between STA813 (RIB 13) and STA874 (RIB 14) and between STA1659 (RIB 27) and STA1713 (RIB 28).
R (6)Before removing the overwing refueling cap, insert the hose bonding
R cable pin into the grounding point near the cap.
R (7)Remove the overwing refueling cap and insert the refueling hose.

CAUTION : DO NOT CLOSE THE ACCESS DOOR 144DR OR OPERATE THE ACCESS DOOR MICROSWITCH UNTIL REFUELING IS COMPLETE

(8)Open the access door 144DR to the refuel/defuel panel 110VU.
(9)If external electrical power is to be used:
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)On panel 110VU, make sure that the PWR SUPPLY switch is in the NORM
R and guarded position.
(10)If external power is not to be used:
(a)Using the aircraft batteries (Ref. 24-31-00, P. Block 1).

NOTE: For this operation it is not necessary to select aircraft batteries ON.



Overwing Refueling Caps
Figure 312

- on panel 110VU, raise the guard and place the PWR SUPPLY switch in the BAT position.

(b)Using the APU generator to supply the aircraft electrical network:
- energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) and make sure that the electronics racks are ventilated (Ref. 24-41-00, P. Block 301).
- on panel 110VU, make sure that the PWR SUPPLY switch is in the NORM and guarded position.

C. Procedure

(1)Do step 1. of the Functional Test - Fuel Quantity Computer (15QT) (Ref. 28-42-38, P. Block 501).

NOTE : When you do this procedure, it is not necessary to do step 2. of the Functional Test - Fuel Quantity Computer (15QT) (Ref. 28-42-38, P. Block 501).

(2)The FQI can display incorrect fuel quantities. You must do the checks that follow each time you refuel the aircraft, to check for FQI over-read.
If there are signs of FQI over-read, you can still refuel the aircraft.
On panel 110VU:
(a)Check the fuel quantity in the trim tank on the FUEL QTY indicator as follows:
1 Put the FUEL QTY/FQI DISPLAY switch in the TT position:
- if the fuel quantity is less than 200 kg (440 lb), then continue with step (b)
- if the fuel quantity is 200 kg (440 lb) or more, then transfer all the fuel to the center tank (Ref. 28-25-00, P. Block 301).

(b)Check the fuel quantity in the center tank on the FUEL QTY indicator as follows:
1 Put the FUEL QTY/FQI DISPLAY switch in the CTR position.
2 If the fuel quantity is less than 3000 kg (6614 lb), then continue with step (c).
3 If the fuel quantity is 3000 kg (6614 lb) or more, then use the center tank magnetic level indicator (MLI) to check the fuel quantity again (Ref. Para. 9.):
- if the difference in the fuel quantity between the FUEL QTY indicator and the MLI in the center tank is less than 1000 kg (2205 lb), then continue with step (c)
- if the difference in the fuel quantity between the FUEL QTY indicator and the MLI in the center tank is more than 1000 kg (2205 lb), then make a record in the Aircraft Technical Log of the fuel quantity in the center tank. Continue with step (c).

(c)Check the fuel quantities in the left and right inner tanks on the FUEL QTY indicator as follows:
1 If the difference in the fuel quantities between the left and right inner tanks is less than 5000 kg (11023 lb), then continue with the refueling procedure.
2 If the difference in the fuel quantities between the left and right

R inner tanks is more than 5000 kg (11023 lb), use the MLI's in the
R inner tanks to check the fuel quantity in each inner tank again
R (Ref. Para. 9.):
R - if the difference in the fuel quantity between the FUEL QTY
R indicator and the MLI's is less than 1000 kg (2205 lb) in each
R inner tank, then continue with the refueling procedure
R - if the difference in the fuel quantity between the FUEL QTY
R indicator and the MLI's is more than 1000 kg (2205 lb) in one or
R both inner tanks, then make a record in the Aircraft Technical Log
R of the fuel quantities in the left and right inner tanks.

R **ON A/C 001-100,

R 3 Put the FUEL QTY switch to the CTR & TT position.
R (d)Continue with the procedure reference step (3).

R **ON A/C 101-200,

R 3 Put the FQI DISPLAY switch in the CTR & AUX & TT position.
R (d)Continue with the procedure reference step (3).

R **ON A/C 101-200,

R Post SB 28-2108 For A/C 101-200,

R 3 Put the FQI DISPLAY switch in the CTR-TT & ACT position.
R (d)Continue with the procedure reference step (3).

R **ON A/C ALL

R (3)Not applicable.
R (4)Not applicable.

R **ON A/C 001-100,

R (5)Continue with the procedure. On panel 110VU:
R (a)Start filling and monitor the quantity of fuel delivered on the FQI.
R Monitor the HIGH LEVEL indicator lights on the panel 110VU.
R Stop filling when the required fuel level is reached or when the HIGH
R LEVEL indicator light(s), come(s) on.
R (b)You can refuel the center tank by transferring fuel from the inner
R tanks (Ref. 28-25-00, P. Block 301).
R (c)If you transferred fuel to the center tank then, complete the filling
R of the inner tanks.
R (d)Make sure that the HIGH LEVEL light is on for any tank that has been
R fully refueled.
R (e)If the outer tanks are not fully refueled and the inner, center and
R trim tanks are empty, then do these steps:
R 1 Use the MLI's to check the fuel quantity in the outer tanks again
R (Ref. Para. 9.).

R 2 Make a record in the Aircraft Technical Log of the fuel quantity in
R each outer tank.

R **ON A/C 101-200,

R (5)Continue with the procecdure. On panel 110VU:
R (a)Start filling and monitor the quantity of fuel delivered on the FQI.
R Monitor the HIGH LEVEL indicator lights on panel 110VU.
R Stop filling when the required fuel level is reached or when the HIGH
R LEVEL indicator light(s), come(s) on.
R (b)You can refuel the center tank by transferring fuel from the inner
R tanks (Ref. 28-25-00, P. Block 301).
R (c)You can refuel the ACT(s) (if installed) by transferring fuel from the
R center tank (Ref. 28-25-00, P. Block 301).
R (d)If you transferred fuel to the ACT(s) then, complete the filling of
R the center tank by transferring fuel from inner tanks (Ref. 28-25-00,
R P. Block 301).
R (e)If you transferred fuel to the center tank then, complete the filling
R of the inner tanks.
R (f)Make sure that the HIGH LEVEL light is on for any tank that has been
R fully refueled.
R (g)If the outer tanks are not fully refueled and the inner, center and
R trim tanks are empty, then do these steps:
R 1 Use the MLI's to check the fuel quantity in the outer tanks again
R (Ref. Para. 9.).
R 2 Make a record in the Aircraft Technical Log of the fuel quantity in
R each outer tank.

**ON A/C ALL

R (6)Open the access door 121BL. On the rack 92VU, push (in) the computer
R (15QT) RESET/MEMORY CLEAR P/BSW for a minimum of 10 seconds.
R Close the access door.
R (7)If the aircraft batteries were used to power the aircraft then, on panel
R 110VU, put the PWR SUPPLY switch in the NORM and guarded position.

R NOTE : After a replacement computer has been installed, all five
R displays on the FUEL QTY indicators will show LA (signifying
R lowered accuracy). LA will be displayed until the first
R successful pressure refueling has occurred.

NOTE : If the CGCC gets degraded fuel data from the Fuel Quantity
R Computer, then the target C of G is reduced (Ref. 31-46-00,
R P. Block 1).

D. Close-Up
(1)Close the access door 144DR.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block
301) and disconnect the electrical ground power unit.
(3)Remove the static electricity grounding and bonding connections in the
following order:

(a)Remove the refueling hose(s) and replace the refueling cap(s).
(b)Remove the refueling hose(s) bonding cable pin(s) from the refueling caps grounding point(s).
(c)Disconnect the tanker bonding cable from the aircraft.
(d)If no longer required disconnect the aircraft and tanker earthground cable(s) (if applicable).

(4)Remove the access platform(s).
(5)Remove the warning notices.

9. Use of Magnetic Level Indicators Using Tabular Data

NOTE : The accuracy of the Magnetic Level Indicators (MLI) is ±5%.
The MLI should not be used to cross-check the FQI.

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
Referenced Procedures	
- 05-57-00, P. Block 1	Aircraft Stability
- 05-57-11, P. Block 1	Aircraft Stability
- 07-11-00, P. Block 1	Jacking For Aircraft Maintenance
- 12-31-28, P. Block 201	Cold Weather Maintenance - Fuel
- 12-32-28, P. Block 301	Fuel - Servicing
- 28-25-00, P. Block 301	Refuel/Defuel System
- 28-43-00, P. Block 1	Quantity Indicating-Magnetic Level Indicators

B. Procedure
(Ref. Fig. 313)

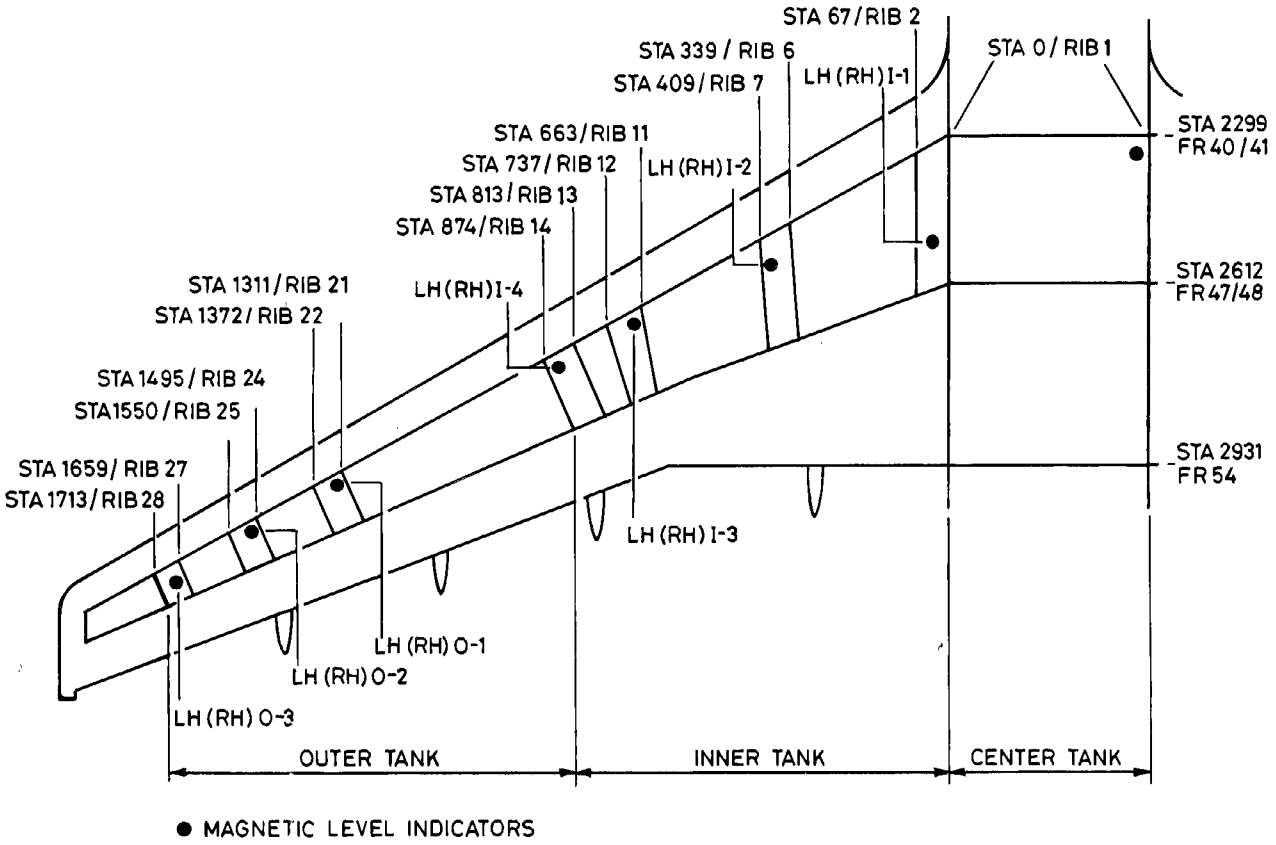
WARNING: FOR EACH MAGNETIC LEVEL INDICATOR (MLI), SEPARATE TABLES ARE PROVIDED FOR THE FOLLOWING AIRCRAFT PITCH ATTITUDES:
- 2 DEG. NOSE DOWN.
- 0 DEG. LEVEL.
- 2 DEG. NOSE UP.
MAKE SURE THAT THE CORRECT TABLE IS SELECTED.

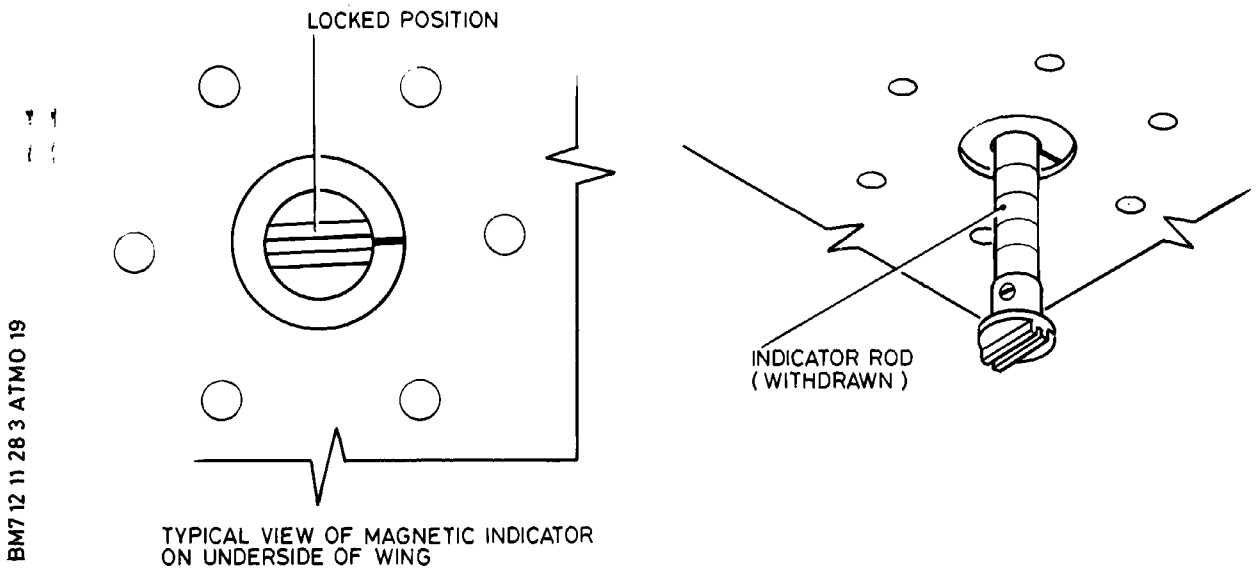
CAUTION : WHEN YOU MUST OPERATE THE REFUEL/DEFUEL PANEL 110VU, IN AMBIENT TEMPERATURES BELOW -40 DEG. C. (-40 DEG. F.), REFER TO THE PROCEDURE FOR THE PREPARATION FOR OPERATION OF THE REFUEL/DEFUEL PANEL 110VU, BELOW -40 DEG. C. (-40 DEG. F.) (REF. 12-31-28, P. Block 201).

NOTE: Each Table has columns for MLI READING and ROLL ATTITUDE (DEGREES) in increments 1 deg, 2 deg WING UP and WING DOWN and 0 deg LEVEL.
Tables apply only for fuel at a specific gravity (SG) of 0.79 KG/LTR.
For other SG's, a correction caculation is made.
MLI READINGS which fall outside the range quoted on the associated table should be ignored.

Tables for fuel at a specific gravity of 0.79 KG/LTR.

(1)Magnetic Level Indicator 1 - Outer Tanks (Ref. Fig. 314, 315, 316)
(2)Magnetic Level Indicator 2 - Outer Tanks (Ref. Fig. 317, 318, 319)
(3)Magnetic Level Indicator 3 - Outer Tanks (Ref. Fig. 320, 321, 322)
(4)Magnetic Level Indicator 1 - Inner Tanks (Ref. Fig. 323, 324, 325)
(Ref. Fig. 326, 327, 328)





Magnetic Level Indicators
Figure 313

(Ref. Fig. 329, 330, 331)
(5)Magnetic Level Indicator 2 - Inner Tanks (Ref. Fig. 332, 333, 334)
(Ref. Fig. 335, 336, 337)
(6)Magnetic Level Indicator 3 - Inner Tanks (Ref. Fig. 338, 339, 340)
(Ref. Fig. 341, 342, 343)
(7)Magnetic Level Indicator 4 - Inner Tanks (Ref. Fig. 344, 345, 346)
(Ref. Fig. 347, 348, 349)
(8)Magnetic Level Indicator - Center Tank (Ref. Fig. 350, 351, 352)
(Ref. Fig. 353, 354, 355)
(Ref. Fig. 356, 357, 358)
(Ref. Fig. 359, 360, 361)

CAUTION: AN EXTENDED MLI IS PRONE TO ACCIDENTAL DAMAGE.

NOTE: MLI's are disposed, as follows:
- three in each outer tank
- four in each inner tank
- one in the center tank
- one in trim tank (used only to check trim tank empty).

(9)Read and note attitude of aircraft pitch and roll axes on clinometers in main landing gear bay (Ref. 28-43-00, P. Block 1):
- Position upper (movable) scale so that pointer is at center of bubble.
- Read degrees attitude indicated by pointer on lower (fixed) scale.

NOTE: Bubble always moves towards high wing or high end of fuselage.

(10)Obtain sample of aircraft fuel (Ref. 12-32-28, P. Block 301) and measure the density/specific gravity (SG).
(11)Position access platform.
(12)Make certain that all MLI's are retracted and locked.

CAUTION: DO NOT ALLOW MLI's TO FALL UNRESTRAINED.

(13)Using a screwdriver, press and quarter turn MLI to unlock. Support MLI manually then lower slowly until magnetic engagement is felt or until float is felt to contact fuel surface.

NOTE: If MLI extends fully (red mark visible) float is not in fuel.

(14)At each MLI, record the graduation nearest the wing skin. Do not read MLI's with red mark visible. For each subsequent reading repeat steps (12) and (13).
(15)For each MLI on which a reading is obtained, select the Fuel Quantity Table with pitch attitude closest to aircraft pitch attitude, noted previously.
(16)On the selected Table identify the ROLL ATTITUDE column which most nearly agrees with aircraft roll attitude. When aircraft roll attitude falls exactly between two ROLL ATTITUDE columns, use the mean value of the quantities in each column.

C. Procedure for fuel at a specific gravity of 0.79.
(1)Read down **MLI READING** column to the appropriate graduation, then across to the relevant **ROLL ATTITUDE** column. This gives fuel quantity at **SG 0.79.**
(2)When more than one reading is obtained per tank, take the average of fuel quantities determined.

D. If necessary, calculate fuel quantity for other **SG's** as follows:

Example: Center Tank **MLI READING (INCREMENT)** : 60
Pitch Attitude : 2 **DEG (NOSE UP)**
ROLL ATTITUDE (DEGREES) : **WING UP 1**
Actual **SG** : 0.81

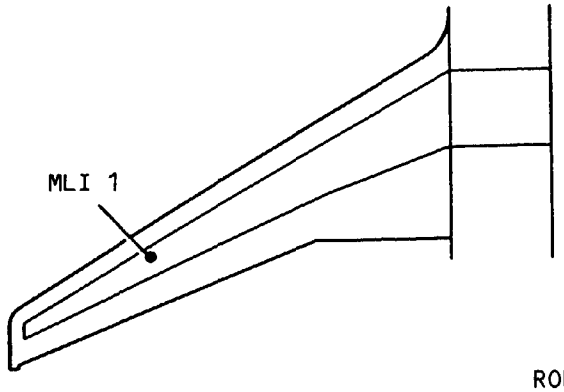
Fuel Quantity at **SG 0.79** = **MLI READING (60)** corrected for aircraft attitude
= 8013 kg (10143 L)

Actual Fuel Quantity = $\frac{8013\ (10143) \times 0.81}{0.79}$
= 8215 kg (10143 L)

E. Close-Up
(1)Retract **MLI** and lock with screwdriver (push and quarter turn).
(2)Remove access platform.

10. Presence of Water and Microbiological Contamination Sampling

NOTE : Sampling of fuel for the presence of water and for microbiological contamination may be carried out periodically (Ref. 12-32-28, P. Block 301).



OUTER TANK MLI 1
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
0	2004	1583	1826	1443	1547	1222	1228	970	901	712
1	2053	1622	1888	1491	1624	1283	1306	1032	982	776
2	2102	1661	1949	1540	1703	1345	1387	1096	1067	843
3	2151	1699	2010	1588	1781	1407	1471	1162	1154	912
4	2199	1737	2070	1636	1860	1469	1556	1229	1244	983
5	2246	1775	2129	1682	1937	1530	1644	1298	1337	1056
6	2293	1812	2187	1727	2012	1590	1733	1369	1433	1132
7	2340	1849	2244	1772	2086	1648	1825	1442	1530	1209
8	2386	1885	2300	1817	2159	1706	1918	1515	1630	1288
9	2431	1920	2356	1861	2231	1763	2012	1589	1733	1369
10	2475	1956	2410	1904	2303	1819	2106	1664	1840	1453
11	2519	1990	2464	1947	2373	1875	2201	1739	1948	1539
12	2563	2025	2518	1989	2442	1929	2296	1814	2058	1626
13	2605	2058	2571	2031	2509	1982	2389	1887	2170	1715
14	2648	2092	2624	2073	2575	2034	2481	1960	2285	1805
15	2690	2125	2675	2113	2640	2086	2570	2030	2400	1896
16	2732	2158	2725	2153	2704	2136	2658	2099	2516	1988
17	2773	2191	2775	2192	2767	2186	2743	2167	2632	2080
18	2814	2223	2824	2231	2828	2234	2827	2233	2748	2171
19	2854	2255	2872	2269	2889	2282	2908	2297	2860	2259
20	2894	2286	2920	2306	2949	2330	2986	2359	2967	2344
21	2932	2317	2966	2343	3007	2376	3063	2419	3069	2425
22	2970	2347	3012	2380	3064	2420	3135	2477	3166	2501
23	3008	2376	3057	2415	3119	2464	3205	2532	3256	2572
24	3044	2405	3101	2450	3174	2508	3272	2585	3340	2639

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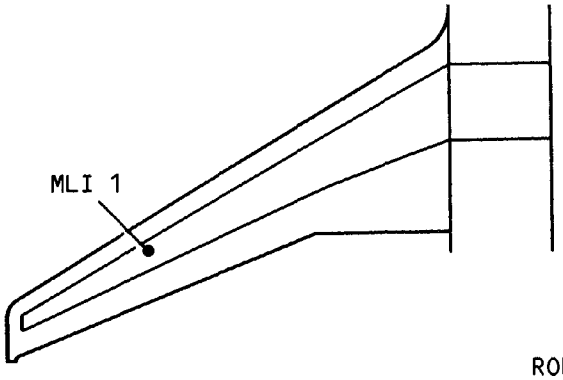
Fuel Quantity Table, MLI 1 - Outer Tank
Figure 314



OUTER TANK MLI 1
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
0	1898	1499	1642	1297	1319	1042	1002	791	674	532
1	1958	1547	1719	1358	1400	1106	1086	858	766	605
2	2019	1595	1797	1419	1483	1172	1173	926	864	683
3	2079	1642	1874	1480	1568	1239	1262	997	966	763
4	2137	1688	1949	1540	1655	1308	1354	1070	1072	847
5	2194	1733	2024	1599	1744	1378	1449	1145	1182	934
6	2251	1778	2098	1658	1835	1450	1547	1222	1297	1024
7	2308	1823	2172	1716	1928	1523	1647	1301	1413	1116
8	2363	1867	2244	1773	2023	1598	1750	1382	1529	1208
9	2417	1910	2315	1829	2118	1673	1855	1465	1644	1299
10	2471	1952	2385	1884	2213	1748	1963	1551	1760	1390
11	2524	1994	2453	1938	2307	1822	2074	1638	1875	1481
12	2576	2035	2520	1991	2400	1896	2186	1727	1990	1572
13	2628	2076	2586	2043	2491	1968	2300	1817	2104	1662
14	2679	2116	2650	2094	2581	2039	2414	1907	2217	1751
15	2729	2156	2714	2144	2668	2108	2529	1998	2329	1840
16	2778	2195	2777	2194	2753	2175	2644	2088	2441	1928
17	2827	2233	2838	2242	2836	2240	2756	2178	2553	2017
18	2875	2271	2898	2289	2917	2304	2867	2265	2666	2106
19	2922	2308	2956	2335	2995	2366	2973	2349	2781	2197
20	2968	2345	3014	2381	3071	2426	3075	2429	2897	2289
21	3013	2380	3070	2426	3143	2483	3171	2505	3015	2382
22	3058	2416	3126	2469	3212	2538	3260	2575	3133	2475
23	3101	2450	3180	2512	3278	2590	3344	2641	3251	2568
24	3145	2484	3232	2553	3340	2639	3421	2703	3367	2660

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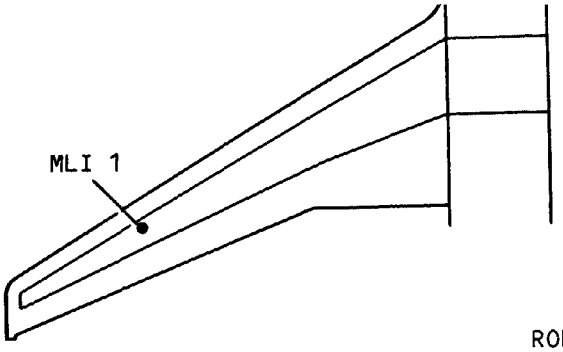
Fuel Quantity Table, MLI 1 - Outer Tank
Figure 315



OUTER TANK MLI 1
PITCH ATTITUDE = 2 DEG. (NOSE UP)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	KG	1 L	KG	LEVEL 0 L	KG	WING DOWN 1 L	KG	2 L	KG
0	1728	1365	1425	1126	1105	873	790	624	530	419
1	1803	1424	1507	1191	1194	943	889	703	648	512
2	1878	1484	1592	1257	1284	1014	994	785	767	606
3	1954	1543	1677	1325	1377	1088	1104	872	886	700
4	2028	1602	1764	1394	1473	1164	1217	962	1005	794
5	2102	1661	1853	1464	1571	1241	1333	1053	1125	889
6	2175	1718	1945	1536	1672	1321	1449	1145	1244	983
7	2246	1774	2037	1609	1774	1402	1565	1237	1363	1077
8	2317	1830	2129	1682	1880	1485	1680	1328	1480	1169
9	2386	1885	2221	1755	1988	1570	1795	1418	1596	1261
10	2455	1939	2313	1827	2098	1657	1909	1508	1710	1351
11	2521	1992	2404	1899	2210	1746	2021	1597	1824	1441
12	2587	2044	2495	1971	2323	1835	2133	1685	1937	1530
13	2651	2094	2583	2041	2436	1924	2245	1773	2050	1619
14	2714	2144	2670	2110	2548	2013	2356	1862	2162	1708
15	2777	2193	2756	2177	2658	2100	2469	1950	2275	1797
16	2838	2242	2838	2242	2767	2186	2582	2040	2388	1887
17	2897	2289	2919	2306	2872	2269	2696	2130	2503	1977
18	2956	2335	2997	2368	2974	2350	2812	2222	2619	2069
19	3013	2380	3073	2427	3074	2428	2928	2313	2736	2161
20	3069	2424	3144	2484	3169	2503	3044	2404	2853	2254
21	3124	2468	3213	2538	3258	2574	3158	2495	2970	2346
22	3178	2510	3278	2590	3341	2640	3270	2583	3087	2438
23	3231	2552	3340	2639	3419	2701	3378	2669	3202	2529
24	3282	2593	3398	2685	3490	2757	3481	2750	3313	2618

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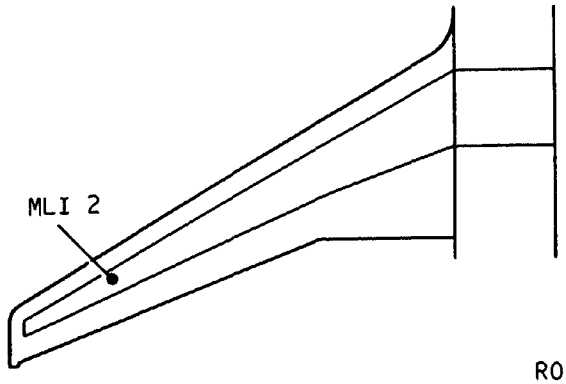
Fuel Quantity Table, MLI 1 - Outer Tank
Figure 316



OUTER TANK MLI 2
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
0	2953	2333	2832	2237	2629	2077	2249	1777	1649	1303
1	2991	2363	2881	2276	2694	2128	2344	1851	1753	1385
2	3028	2392	2928	2313	2757	2178	2437	1925	1861	1470
3	3065	2421	2976	2351	2820	2227	2527	1997	1970	1556
4	3101	2450	3022	2387	2881	2276	2616	2067	2081	1644
5	3138	2479	3067	2423	2941	2323	2704	2136	2195	1734
6	3174	2507	3111	2458	3000	2370	2789	2203	2310	1825
7	3209	2535	3154	2492	3057	2415	2872	2269	2426	1916
8	3244	2563	3197	2526	3113	2459	2952	2332	2542	2008
9	3279	2591	3239	2559	3169	2503	3029	2393	2659	2101
10	3313	2618	3280	2592	3223	2546	3104	2452	2775	2192
11	3347	2644	3321	2623	3275	2587	3176	2509	2886	2280
12	3380	2670	3361	2655	3326	2627	3244	2563	2993	2365
13	3412	2696	3401	2686	3375	2666	3309	2614	3094	2445
14	3444	2721	3439	2717	3422	2703	3371	2663	3190	2520
15	3476	2746	3477	2747	3467	2739	3430	2709	3279	2590
16	3506	2770	3513	2776	3511	2774	3484	2752	3362	2656
17	3536	2794	3549	2804	3553	2807	3535	2793	3439	2717
18	3566	2817	3583	2831	3592	2838	3583	2830	3510	2773
19	3595	2840	3616	2856	3629	2867	3628	2866	3577	2826

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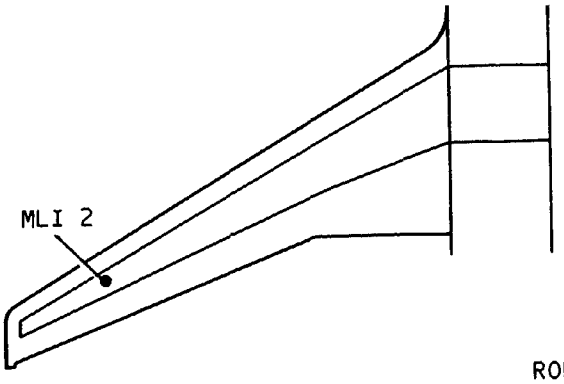
Fuel Quantity Table, MLI 2 - Outer Tank
Figure 317



ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
0	2896	2288	2720	2149	2376	1877	1792	1415	1191	941
1	2943	2325	2783	2199	2468	1950	1899	1500	1306	1032
2	2990	2362	2845	2248	2559	2022	2009	1587	1424	1125
3	3035	2398	2905	2295	2648	2092	2122	1677	1541	1217
4	3080	2433	2964	2342	2735	2160	2236	1767	1657	1309
5	3124	2468	3022	2387	2819	2227	2351	1858	1774	1401
6	3167	2502	3079	2432	2901	2292	2467	1949	1890	1493
7	3210	2536	3135	2477	2981	2355	2583	2041	2005	1584
8	3252	2569	3189	2519	3058	2415	2698	2132	2120	1675
9	3293	2602	3242	2561	3132	2474	2811	2221	2234	1765
10	3334	2634	3294	2602	3202	2530	2921	2307	2348	1855
11	3374	2665	3345	2642	3269	2582	3026	2391	2460	1944
12	3413	2696	3394	2681	3332	2633	3126	2469	2574	2033
13	3452	2727	3440	2718	3392	2680	3219	2543	2688	2123
14	3489	2756	3485	2753	3449	2725	3306	2612	2804	2215
15	3525	2785	3528	2787	3503	2767	3387	2676	2922	2308
16	3561	2813	3569	2819	3553	2807	3462	2735	3041	2402
17	3594	2839	3607	2849	3600	2844	3532	2790	3160	2496
18	3626	2865	3643	2878	3644	2879	3595	2840	3279	2590
19	3656	2888	3677	2905	3685	2911	3652	2885	3395	2682

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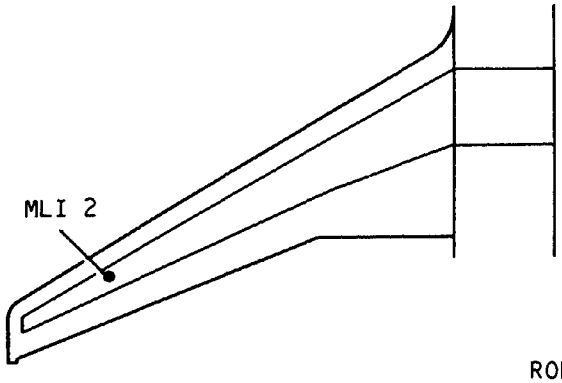
Fuel Quantity Table, MLI 2 - Outer Tank
Figure 318



OUTER TANK MLI 2
PITCH ATTITUDE = 2 DEG. (NOSE UP)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

	WING UP				LEVEL		WING DOWN			
MLI	2		1		0		1		2	
READING (INCREMENT)	L	KG	L	KG	L	KG	L	KG	L	KG
0	2798	2211	2493	1969	1946	1538	1365	1078	759	600
1	2860	2259	2583	2041	2058	1626	1483	1172	881	696
2	2920	2307	2671	2110	2171	1715	1600	1264	1002	791
3	2979	2353	2758	2178	2285	1805	1717	1356	1122	887
4	3036	2398	2842	2245	2400	1896	1833	1448	1243	982
5	3093	2443	2923	2309	2514	1986	1948	1539	1364	1077
6	3148	2487	3003	2372	2626	2075	2061	1629	1482	1171
7	3202	2530	3079	2432	2737	2162	2174	1718	1599	1263
8	3256	2572	3151	2489	2844	2247	2288	1807	1715	1355
9	3307	2613	3220	2544	2949	2330	2401	1897	1830	1446
10	3358	2653	3286	2596	3051	2410	2515	1987	1945	1536
11	3406	2691	3349	2646	3148	2487	2630	2078	2058	1626
12	3453	2728	3407	2692	3240	2560	2747	2170	2172	1716
13	3497	2763	3463	2735	3326	2627	2865	2263	2287	1807
14	3539	2796	3515	2777	3405	2690	2982	2356	2402	1897
15	3579	2827	3565	2816	3479	2748	3099	2448	2518	1989
16	3616	2857	3611	2853	3548	2803	3213	2538	2635	2082
17	3652	2885	3655	2887	3611	2852	3325	2627	2754	2176
18	3685	2911	3695	2919	3668	2897	3432	2711	2872	2269
19	3716	2935	3732	2948	3719	2938	3534	2792	2991	2363

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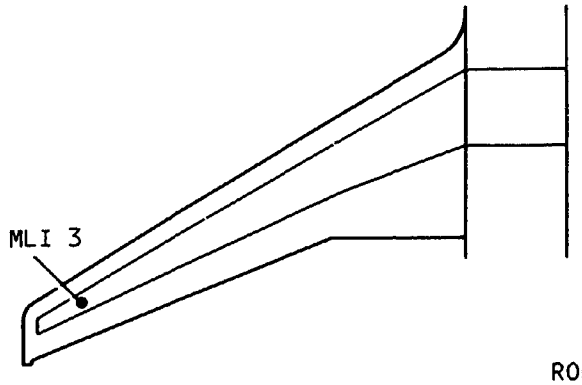
Fuel Quantity Table, MLI 2 - Outer Tank
Figure 319



OUTER TANK MLI 3
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

	WING UP				LEVEL		WING DOWN			
MLI	2		1		0		1		2	
READING (INCREMENT)	L	KG	L	KG	L	KG	L	KG	L	KG
0	3673	2901	3611	2853	3504	2768	3297	2605	2750	2173
1	3697	2921	3642	2877	3546	2801	3359	2654	2862	2261
2	3721	2939	3671	2900	3585	2832	3418	2700	2969	2345
3	3743	2957	3699	2922	3623	2862	3473	2743	3071	2426
4	3765	2974	3726	2943	3658	2890	3524	2784	3167	2502
5	3785	2990	3750	2963	3690	2915	3572	2822	3257	2573
6	3803	3004	3773	2981	3721	2940	3618	2858	3341	2639
7	3820	3018	3795	2998	3750	2963	3661	2892	3419	2701
8	3836	3031	3815	3014	3777	2984	3700	2923	3491	2758
9	3852	3043	3833	3028	3801	3003	3736	2952	3558	2811
10	3866	3054	3851	3042	3824	3021	3770	2978	3620	2860
11	3879	3064	3867	3055	3845	3037	3801	3003	3676	2904
12	3890	3073	3881	3066	3864	3052	3829	3025	3726	2944
13	3901	3081	3893	3076	3881	3066	3853	3044	3772	2980
14	3910	3089	3905	3085	3896	3078	3875	3061	3813	3012

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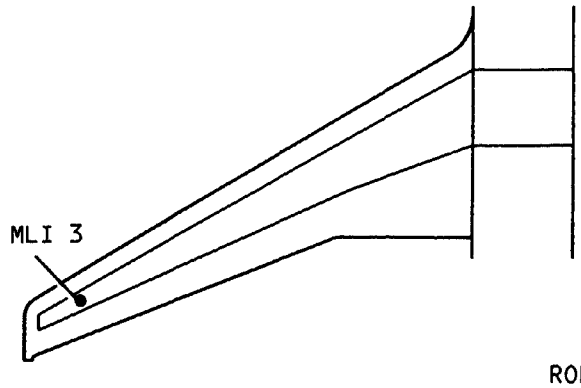
Fuel Quantity Table, MLI 3 - Outer Tank
Figure 320



OUTER TANK MLI 3
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
0	3607	2849	3500	2765	3290	2599	2732	2158	1806	1427
1	3638	2874	3543	2799	3352	2648	2843	2246	1921	1518
2	3667	2897	3582	2830	3410	2694	2952	2332	2036	1609
3	3696	2919	3619	2859	3466	2738	3055	2414	2150	1699
4	3722	2940	3655	2887	3518	2779	3153	2490	2264	1788
5	3747	2960	3688	2913	3567	2818	3244	2562	2376	1877
6	3770	2978	3719	2938	3613	2855	3329	2630	2489	1966
7	3792	2996	3748	2961	3657	2889	3408	2692	2602	2055
8	3813	3012	3775	2982	3697	2920	3482	2750	2716	2146
9	3832	3027	3800	3002	3734	2950	3549	2804	2832	2237
10	3849	3040	3823	3020	3768	2977	3610	2852	2950	2330
11	3864	3053	3844	3037	3799	3001	3666	2897	3068	2424
12	3879	3064	3863	3052	3827	3024	3719	2938	3187	2518
13	3892	3075	3880	3065	3853	3044	3768	2977	3305	2611
14	3904	3084	3895	3077	3875	3061	3812	3011	3420	2702

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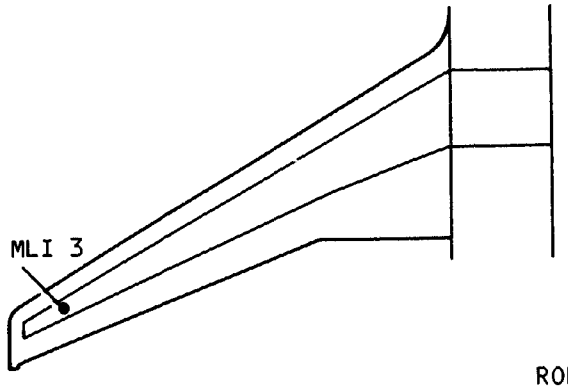
Fuel Quantity Table, MLI 3 - Outer Tank
Figure 321



OUTER TANK MLI 3
PITCH ATTITUDE = 2 DEG. (NOSE UP)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
0	3491	2758	3275	2587	2715	2145	1807	1428	852	673
1	3533	2791	3338	2637	2823	2230	1922	1519	973	768
2	3573	2823	3398	2684	2928	2313	2036	1609	1093	864
3	3611	2853	3453	2728	3031	2395	2150	1698	1214	959
4	3647	2881	3506	2770	3130	2472	2263	1787	1335	1054
5	3680	2908	3557	2810	3223	2546	2376	1877	1454	1148
6	3712	2932	3604	2847	3309	2614	2490	1967	1571	1241
7	3741	2956	3648	2882	3390	2678	2605	2058	1687	1333
8	3769	2977	3688	2914	3465	2738	2721	2150	1802	1424
9	3794	2997	3726	2943	3535	2793	2839	2243	1917	1514
10	3817	3016	3761	2971	3599	2843	2956	2336	2031	1604
11	3839	3033	3792	2996	3657	2889	3073	2428	2144	1694
12	3858	3048	3821	3018	3710	2931	3188	2519	2259	1784
13	3876	3062	3846	3039	3758	2969	3301	2608	2373	1875
14	3891	3074	3869	3057	3801	3002	3409	2693	2489	1966

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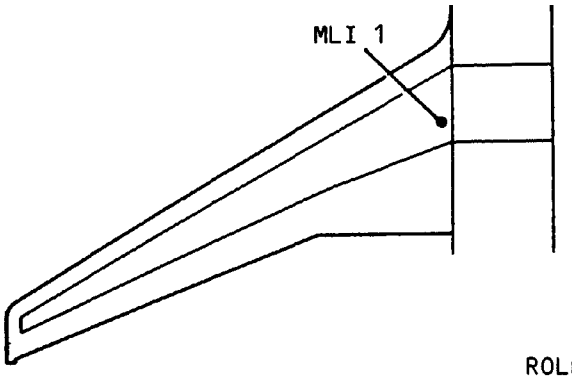
Fuel Quantity Table, MLI 3 - Outer Tank
Figure 322



INNER TANK MLI 1
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	1 L	1 KG	LEVEL 0 L	LEVEL 0 KG	1 L	WING DOWN 1 KG	2 L	WING DOWN 2 KG
0	78	62	76	60	72	57	71	56	68	53
1	94	74	92	73	89	71	88	70	85	67
2	112	88	110	87	108	85	106	84	104	82
3	130	103	128	101	127	100	126	99	124	98
4	149	118	148	117	146	116	147	116	146	115
5	169	134	169	133	167	132	169	134	169	134
6	190	150	190	150	190	150	192	152	193	153
7	212	167	212	168	213	169	216	171	219	173
8	235	186	236	187	238	188	242	191	246	194
9	259	205	262	207	264	209	268	212	273	216
10	284	224	287	227	291	230	296	234	302	239
11	309	244	314	248	319	252	325	257	332	263
12	337	266	341	270	348	275	356	281	364	288
13	364	288	370	293	377	298	387	306	397	314
14	393	310	400	316	408	322	419	331	432	341
15	422	334	431	340	440	348	453	358	467	369
16	453	358	463	366	474	374	488	386	504	398
17	485	383	495	391	508	401	524	414	542	428
18	517	408	529	418	544	429	561	443	581	459
19	550	435	564	445	580	458	599	474	622	491
20	585	462	599	473	618	488	639	505	664	524
21	620	490	636	503	656	519	680	537	707	559
22	657	519	674	533	696	550	721	570	752	594
23	694	548	713	563	737	582	765	604	798	630
24	732	579	753	595	779	615	811	640	848	668
25	772	610	794	628	822	650	857	677	894	706
26	812	641	837	661	867	685	902	713	945	747
27	853	674	880	695	912	721	950	750	997	788
28	895	707	924	730	959	758	1000	790	1051	830
29	938	741	969	765	1007	795	1051	830	1105	873
30	982	776	1015	802	1056	834	1104	872	1162	918

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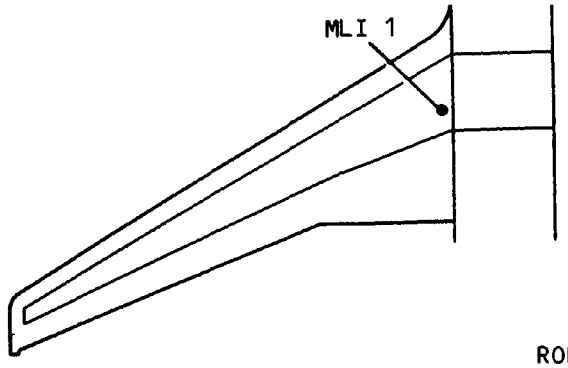
Fuel Quantity Table, MLI 1 - Inner Tank
Figure 323



INNER TANK MLI 1
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2		1		LEVEL 0		1	WING DOWN	2	
	L	KG	L	KG	L	KG	L	KG	L	KG
31	1027	812	1062	839	1106	874	1157	914	1219	963
32	1074	848	1111	878	1158	915	1211	957	1278	1010
33	1121	886	1161	917	1211	957	1266	1000	1338	1057
34	1169	924	1212	957	1265	1000	1323	1045	1398	1105
35	1219	963	1264	998	1320	1043	1381	1091	1460	1154
36	1269	1003	1317	1041	1376	1087	1441	1139	1524	1204
37	1321	1043	1372	1084	1434	1133	1503	1188	1590	1256
38	1373	1085	1427	1127	1492	1179	1567	1238	1658	1310
39	1427	1127	1483	1171	1551	1226	1631	1288	1727	1365
40	1481	1170	1540	1217	1612	1273	1696	1340	1799	1421
41	1536	1214	1599	1263	1674	1322	1763	1393	1872	1479
42	1593	1259	1659	1311	1737	1372	1832	1448	1946	1537
43	1651	1304	1720	1359	1802	1423	1903	1503	2022	1597
44	1710	1351	1783	1408	1867	1475	1974	1559	2100	1659
45	1769	1398	1846	1459	1934	1528	2046	1617	2179	1721
46	1830	1446	1911	1509	2003	1582	2120	1675	2259	1785
47	1890	1493	1976	1561	2074	1638	2195	1734	2340	1849
48	1950	1540	2043	1614	2146	1695	2271	1794	2424	1915
49	2010	1588	2110	1667	2218	1752	2349	1856	2509	1982
50	2070	1636	2180	1722	2292	1811	2429	1919	2595	2050
51	2133	1685	2250	1777	2367	1870	2509	1982	2683	2119
52	2199	1738	2321	1833	2443	1930	2591	2047	2772	2190
53	2268	1791	2393	1890	2521	1991	2674	2113	2863	2262
54	2337	1846	2466	1948	2600	2054	2759	2180	2956	2335
55	2408	1902	2541	2007	2680	2117	2845	2248	3051	2410
56	2479	1959	2616	2067	2761	2181	2933	2317	3147	2486
57	2552	2016	2693	2127	2844	2247	3021	2387	3245	2563
58	2625	2074	2771	2189	2927	2313	3111	2458	3344	2642
59	2699	2132	2850	2252	3013	2380	3203	2530	3445	2722
60	2775	2192	2930	2315	3099	2449	3296	2604	3548	2803

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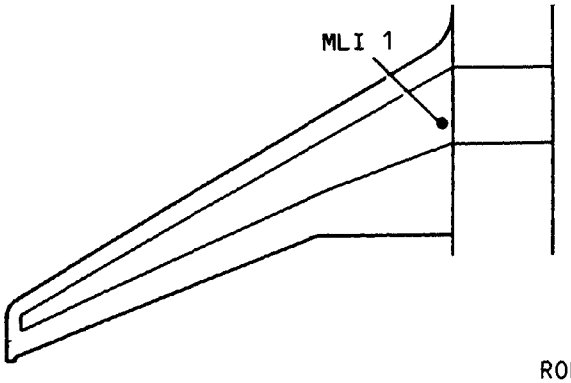
Fuel Quantity Table, MLI 1 - Inner Tank
Figure 324



INNER TANK MLI 1
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
61	2852	2253	3011	2379	3187	2518	3391	2679	3653	2886
62	2930	2315	3094	2444	3276	2588	3487	2755	3759	2970
63	3008	2377	3178	2510	3366	2659	3585	2832	3867	3055
64	3089	2440	3263	2578	3458	2732	3684	2910	3977	3142
65	3170	2504	3349	2646	3551	2805	3785	2990	4088	3230
66	3253	2570	3437	2715	3645	2880	3887	3071	4201	3318
67	3336	2635	3525	2785	3740	2955	3991	3153	4315	3409
68	3420	2702	3614	2855	3837	3031	4096	3236	4431	3500
69	3505	2769	3705	2927	3935	3109	4203	3320	4549	3594
70	3592	2837	3797	2999	4036	3188	4311	3406	4668	3688
71	3679	2906	3890	3073	4137	3268	4421	3493	4790	3784
72	3768	2977	3985	3148	4239	3349	4532	3580	4914	3882
73	3858	3048	4081	3224	4343	3431	4644	3669	5040	3982
74	3949	3119	4178	3300	4448	3514	4759	3759	5168	4083
75	4040	3192	4276	3378	4554	3598	4874	3851	5298	4185
76	4133	3265	4375	3456	4662	3683	4991	3943	5431	4290
77	4228	3340	4476	3536	4771	3769	5110	4037	5565	4397
78	4323	3415	4578	3617	4882	3856	5230	4132	5702	4505
79	4420	3491	4682	3699	4993	3945	5353	4229	5842	4615
80	4517	3569	4787	3781	5106	4034	5477	4327	5983	4727
81	4616	3647	4892	3865	5220	4124	5603	4426	6127	4840
82	4716	3726	4999	3949	5336	4215	5730	4527	6274	4956
83	4817	3805	5107	4034	5454	4308	5860	4629	6423	5074
84	4919	3886	5216	4120	5572	4402	5991	4733	6574	5194
85	5022	3967	5326	4207	5690	4495	6124	4838	6728	5315
86	5126	4049	5437	4295	5807	4588	6259	4945	6885	5439
87	5229	4131	5548	4383	5927	4682	6395	5052	7044	5565
88	5334	4214	5662	4473	6048	4778	6533	5161	7205	5692
89	5441	4298	5776	4563	6171	4875	6673	5272	7370	5822
90	5547	4382	5891	4654	6297	4975	6814	5383	7535	5953

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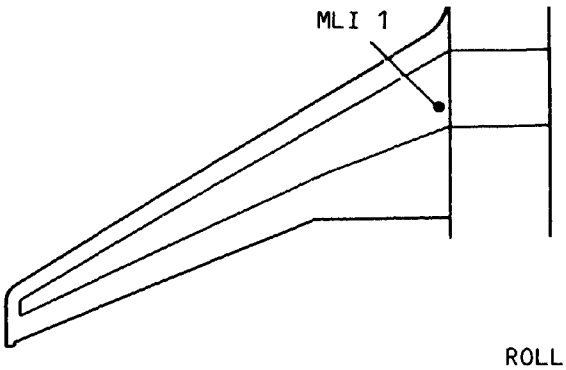
Fuel Quantity Table, MLI 1 - Inner Tank
Figure 325



INNER TANK MLI 1
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	KG	1 L	KG	LEVEL 0 L	KG	WING DOWN 1 L	KG	2 L	KG
0	46	36	43	34	41	32	38	30	35	28
1	60	48	57	45	55	44	53	41	50	40
2	75	60	73	58	71	56	68	54	66	52
3	92	72	89	70	87	69	85	67	84	66
4	109	86	106	84	105	83	104	82	103	81
5	127	100	125	99	124	98	124	98	123	97
6	146	115	145	114	144	114	144	114	145	115
7	165	131	165	130	166	131	166	131	168	133
8	186	147	186	147	188	148	189	149	192	152
9	208	164	209	165	211	167	214	169	218	172
10	231	182	233	184	236	186	239	189	245	193
11	254	201	258	204	261	206	266	210	273	216
12	279	221	284	224	288	228	294	233	302	239
13	305	241	311	245	316	250	324	256	333	263
14	332	262	339	267	346	273	355	280	366	289
15	360	284	368	291	376	297	387	306	400	316
16	389	308	398	314	408	322	420	332	435	343
17	420	331	429	339	441	348	454	359	471	372
18	450	356	461	364	475	375	489	387	508	402
19	482	381	494	390	510	403	527	416	547	433
20	515	407	529	418	545	431	565	446	588	465
21	549	434	565	446	582	460	604	477	630	498
22	584	461	601	475	621	490	644	509	673	532
23	620	490	639	504	660	522	686	542	718	567
24	657	519	677	535	701	554	730	576	764	604
25	695	549	717	566	743	587	775	612	813	642
26	734	580	758	599	786	621	821	649	862	681
27	774	611	800	632	831	657	868	686	913	721
28	814	643	843	666	877	693	917	725	966	763
29	857	677	888	701	924	730	968	765	1020	806
30	900	711	933	737	972	768	1020	806	1076	850

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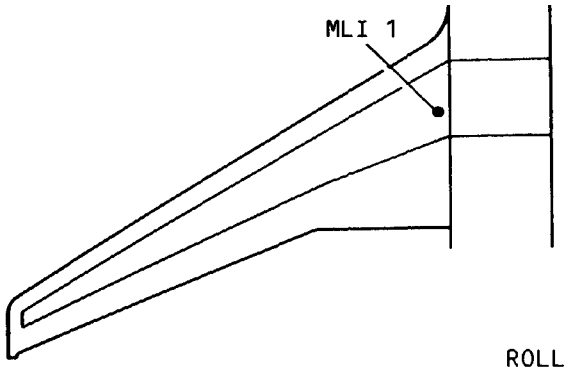
Fuel Quantity Table, MLI 1 - Inner Tank
Figure 326



INNER TANK MLI 1
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
31	944	746	980	774	1022	807	1073	847	1133	895
32	990	782	1028	812	1073	848	1127	890	1192	942
33	1036	818	1077	851	1126	889	1183	934	1253	990
34	1083	856	1127	890	1179	931	1240	979	1315	1039
35	1132	894	1179	931	1233	974	1298	1025	1379	1090
36	1181	933	1231	973	1289	1018	1358	1073	1445	1141
37	1232	973	1285	1015	1345	1063	1419	1121	1512	1195
38	1284	1014	1340	1059	1403	1109	1483	1171	1582	1250
39	1337	1056	1396	1103	1464	1156	1548	1223	1652	1305
40	1392	1099	1453	1148	1526	1206	1614	1275	1724	1362
41	1447	1143	1512	1194	1591	1257	1682	1328	1799	1421
42	1503	1187	1572	1242	1656	1308	1751	1383	1875	1481
43	1559	1232	1632	1290	1722	1360	1822	1439	1952	1542
44	1617	1278	1695	1339	1789	1413	1894	1496	2031	1604
45	1677	1325	1758	1389	1857	1467	1968	1554	2112	1668
46	1738	1373	1823	1440	1926	1522	2043	1614	2195	1734
47	1800	1422	1889	1492	1997	1578	2120	1675	2279	1800
48	1863	1472	1957	1546	2070	1635	2198	1737	2365	1868
49	1927	1523	2025	1600	2144	1694	2278	1799	2453	1938
50	1993	1574	2096	1655	2219	1753	2359	1863	2542	2008
51	2060	1627	2166	1711	2296	1814	2442	1929	2633	2080
52	2128	1681	2238	1768	2374	1875	2526	1995	2726	2153
53	2197	1735	2312	1826	2453	1938	2611	2063	2821	2228
54	2267	1791	2387	1886	2533	2001	2698	2132	2917	2305
55	2338	1847	2463	1945	2615	2066	2787	2202	3015	2382
56	2410	1904	2539	2006	2698	2132	2877	2272	3115	2461
57	2483	1962	2617	2067	2783	2198	2968	2345	3217	2542
58	2558	2020	2696	2130	2869	2266	3061	2418	3321	2624
59	2633	2080	2777	2194	2956	2335	3156	2493	3427	2707
60	2710	2141	2859	2258	3044	2405	3252	2569	3534	2792

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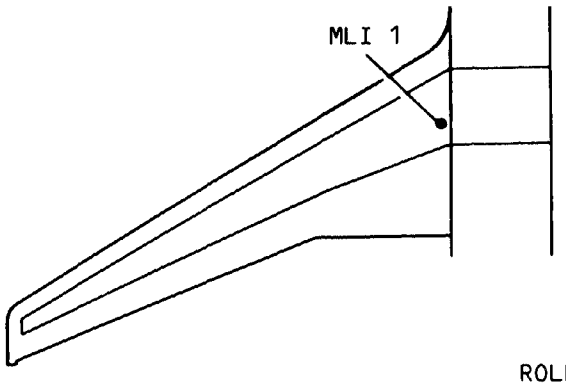
Fuel Quantity Table, MLI 1 - Inner Tank
Figure 327



INNER TANK MLI 1
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
61	2788	2202	2941	2342	3134	2476	3349	2646	3645	2879
62	2866	2264	3025	2390	3226	2548	3449	2725	3757	2968
63	2946	2327	3111	2457	3318	2622	3551	2805	3870	3058
64	3027	2391	3197	2526	3413	2696	3655	2887	3986	3149
65	3110	2457	3285	2595	3508	2772	3760	2970	4105	3243
66	3193	2523	3374	2666	3606	2848	3866	3054	4224	3337
67	3278	2589	3465	2737	3704	2926	3974	3140	4345	3432
68	3363	2657	3557	2810	3804	3005	4084	3226	4466	3528
69	3450	2725	3650	2883	3906	3085	4196	3315	4588	3625
70	3538	2795	3744	2958	4009	3167	4309	3404	4714	3724
71	3627	2866	3840	3033	4114	3250	4425	3495	4843	3826
72	3718	2937	3937	3110	4220	3333	4542	3588	4977	3931
73	3810	3010	4035	3188	4327	3419	4660	3681	5113	4039
74	3902	3083	4135	3267	4437	3505	4779	3776	5252	4149
75	3996	3157	4236	3347	4548	3593	4900	3871	5395	4262
76	4091	3232	4338	3427	4660	3681	5021	3967	5540	4377
77	4188	3308	4443	3510	4774	3771	5144	4064	5689	4494
78	4285	3386	4548	3593	4889	3862	5270	4164	5840	4614
79	4384	3463	4655	3677	5005	3954	5399	4266	5996	4737
80	4484	3542	4763	3763	5123	4048	5532	4370	6155	4863
81	4586	3623	4872	3849	5243	4142	5667	4477	6318	4991
82	4689	3704	4983	3937	5364	4237	5804	4585	6485	5123
83	4792	3786	5095	4025	5485	4333	5943	4695	6655	5258
84	4897	3869	5208	4114	5607	4429	6084	4806	6830	5396
85	5003	3952	5322	4204	5731	4527	6227	4919	7009	5537
86	5109	4036	5437	4295	5858	4628	6372	5034	7192	5682
87	5218	4122	5554	4388	5987	4729	6520	5151	7378	5828
88	5326	4208	5671	4480	6117	4832	6670	5270	7566	5977
89	5436	4294	5789	4574	6249	4936	6823	5390	7756	6127
90	5546	4381	5908	4667	6382	5042	6977	5513	7948	6279

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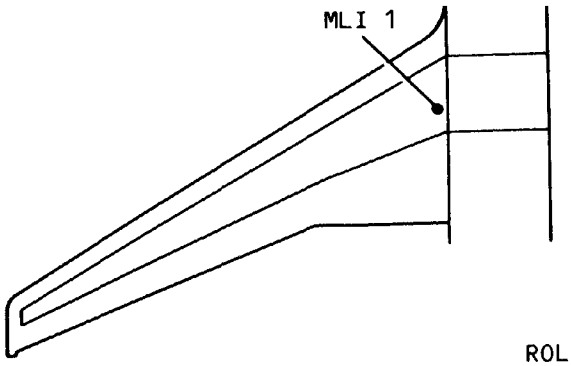
Fuel Quantity Table, MLI 1 - Inner Tank
Figure 328



INNER TANK MLI 1
PITCH ATTITUDE = 2 DEG. (NOSE UP)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
0	28	22	25	20	23	18	21	16	19	15
1	41	32	38	30	36	28	34	26	32	25
2	54	43	51	41	49	39	48	38	46	37
3	68	53	66	52	64	50	63	50	62	49
4	83	65	81	64	79	63	79	62	78	62
5	98	78	97	77	96	76	96	76	96	76
6	115	91	115	90	114	90	115	90	115	91
7	133	105	133	105	133	105	135	106	136	107
8	152	120	153	121	153	121	155	123	158	125
9	172	136	173	137	174	138	177	140	181	143
10	193	152	195	154	197	155	200	158	205	162
11	215	170	217	172	220	174	225	178	231	182
12	238	188	241	191	245	193	251	198	258	204
13	262	207	266	210	271	214	278	220	286	226
14	287	226	292	230	299	236	307	242	317	250
15	313	247	319	252	327	258	337	266	348	275
16	340	268	348	275	356	282	368	290	381	301
17	368	291	377	298	387	306	400	316	415	328
18	397	314	408	322	419	331	434	343	451	356
19	427	338	439	347	453	358	469	370	489	386
20	459	362	472	373	487	385	505	399	528	417
21	491	388	506	400	523	413	543	429	568	449
22	524	414	541	428	560	442	582	460	610	482
23	559	442	577	456	598	472	623	492	654	517
24	595	470	614	485	637	503	665	525	699	552
25	632	499	653	516	678	536	709	560	746	590
26	669	529	693	547	720	569	754	595	795	628
27	708	559	734	580	763	603	800	632	845	668
28	747	590	776	613	808	639	848	670	897	709
29	788	623	819	647	855	675	898	710	951	751
30	831	656	864	683	902	713	950	750	1006	795

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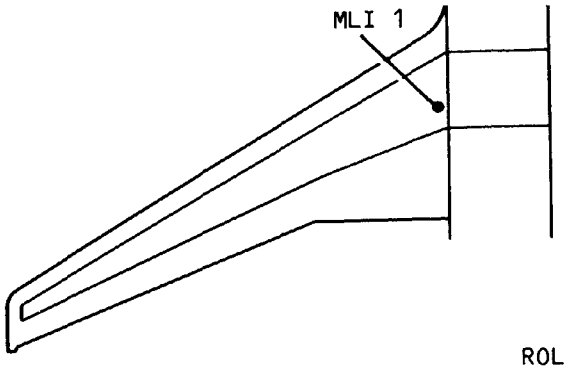
Fuel Quantity Table, MLI 1 - Inner Tank
Figure 329



INNER TANK MLI 1
PITCH ATTITUDE = 2 DEG. (NOSE UP)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	1 L	1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	2 L	2 KG
31	874	691	910	719	952	752	1002	792	1064	840
32	919	726	957	756	1002	792	1056	834	1123	887
33	964	762	1005	794	1054	833	1112	878	1184	935
34	1011	798	1055	833	1107	875	1169	924	1246	985
35	1059	836	1106	874	1161	917	1229	971	1311	1035
36	1108	875	1158	915	1216	961	1289	1019	1377	1088
37	1158	915	1212	957	1273	1006	1351	1068	1445	1142
38	1209	955	1267	1001	1332	1052	1415	1118	1516	1197
39	1262	997	1322	1045	1393	1100	1480	1169	1587	1254
40	1316	1040	1379	1089	1455	1149	1547	1222	1661	1312
41	1371	1083	1437	1136	1518	1199	1616	1276	1736	1371
42	1427	1127	1498	1183	1583	1250	1686	1332	1813	1432
43	1484	1172	1560	1232	1649	1303	1757	1388	1892	1495
44	1543	1219	1622	1282	1716	1356	1831	1446	1974	1559
45	1603	1266	1686	1332	1785	1410	1906	1505	2057	1625
46	1664	1314	1751	1383	1856	1466	1982	1566	2141	1692
47	1726	1363	1817	1436	1928	1523	2060	1628	2228	1760
48	1789	1414	1886	1490	2001	1581	2140	1691	2317	1830
49	1854	1464	1955	1544	2076	1640	2222	1755	2408	1902
50	1920	1516	2025	1600	2153	1701	2305	1821	2501	1976
51	1987	1570	2097	1657	2231	1762	2390	1888	2596	2051
52	2055	1624	2171	1715	2310	1825	2476	1956	2693	2128
53	2125	1679	2245	1774	2391	1889	2565	2026	2792	2206
54	2196	1735	2321	1833	2473	1954	2655	2097	2893	2286
55	2268	1792	2398	1894	2557	2020	2747	2170	2997	2368
56	2341	1850	2476	1956	2642	2087	2840	2244	3130	2451
57	2416	1908	2556	2019	2729	2156	2935	2318	3210	2536
58	2491	1968	2637	2083	2817	2226	3032	2395	3320	2623
59	2568	2029	2719	2148	2907	2297	3131	2473	3432	2712
60	2646	2090	2802	2214	2999	2369	3231	2553	3547	2802

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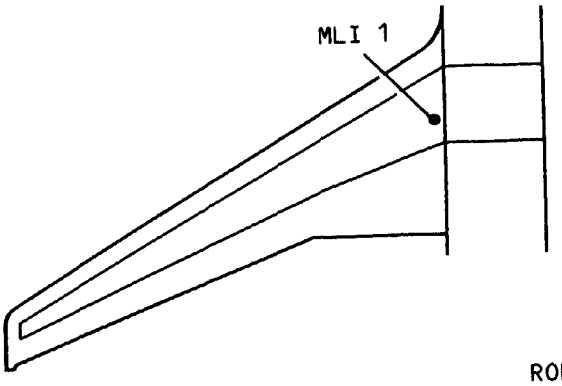
Fuel Quantity Table, MLI 1 - Inner Tank
Figure 330



INNER TANK MLI 1
PITCH ATTITUDE = 2 DEG. (NOSE UP)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
61	2725	2152	2888	2281	3092	2442	3333	2633	3664	2895
62	2805	2216	2974	2349	3186	2517	3437	2715	3783	2988
63	2887	2281	3062	2419	3282	2593	3543	2799	3903	3084
64	2970	2346	3150	2489	3380	2670	3651	2885	4027	3181
65	3054	2412	3241	2560	3479	2748	3762	2972	4153	3281
66	3138	2479	3332	2632	3580	2828	3874	3060	4283	3384
67	3225	2548	3425	2706	3682	2909	3988	3150	4417	3489
68	3313	2617	3520	2781	3787	2991	4103	3242	4554	3598
69	3401	2687	3616	2856	3892	3075	4221	3334	4694	3708
70	3491	2758	3713	2933	4000	3160	4340	3429	4837	3821
71	3583	2831	3811	3011	4109	3246	4462	3525	4984	3937
72	3676	2904	3911	3090	4220	3334	4586	3623	5136	4057
73	3770	2978	4013	3170	4333	3423	4712	3723	5293	4181
74	3865	3053	4116	3252	4448	3514	4841	3825	5456	4310
75	3962	3130	4221	3335	4563	3605	4973	3929	5625	4444
76	4060	3207	4327	3419	4681	3698	5107	4034	5801	4583
77	4159	3286	4435	3504	4801	3792	5243	4142	5983	4727
78	4259	3365	4545	3590	4921	3888	5381	4251	6171	4875
79	4361	3445	4656	3678	5044	3985	5522	4363	6363	5027
80	4465	3527	4768	3767	5168	4083	5667	4477	6558	5181
81	4569	3609	4882	3856	5295	4183	5814	4593	6754	5336
82	4674	3693	4997	3947	5424	4285	5965	4712	6952	5492
83	4781	3777	5113	4039	5554	4388	6119	4834	7152	5650
84	4890	3863	5231	4132	5686	4492	6277	4959	7353	5809
85	4999	3949	5349	4226	5820	4598	6438	5086	7553	5967
86	5109	4036	5469	4320	5956	4705	6603	5216	7753	6125
87	5221	4124	5590	4416	6094	4814	6772	5350	7953	6283
88	5333	4213	5713	4513	6234	4925	6945	5487	8153	6441
89	5446	4303	5837	4611	6375	5036	7123	5627	8352	6598
90	5561	4393	5963	4711	6519	5150	7304	5770	8549	6754

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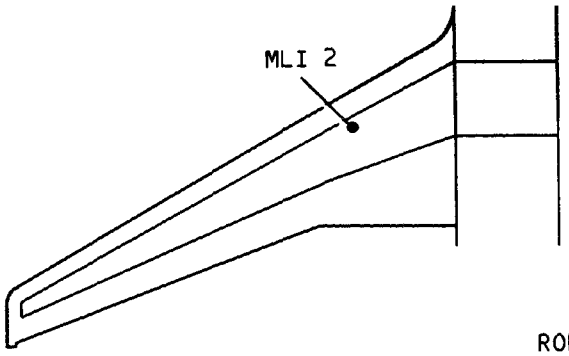
Fuel Quantity Table, MLI 1 - Inner Tank
Figure 331



INNER TANK MLI 2
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2		1		LEVEL 0		1		WING DOWN 2	
	L	KG	L	KG	L	KG	L	KG	L	KG
0	5516	4357	5137	4058	4758	3759	4366	3449	3992	3153
1	5623	4442	5246	4145	4868	3846	4476	3536	4103	3242
2	5731	4528	5357	4232	4980	3934	4588	3625	4216	3331
3	5841	4614	5469	4320	5093	4023	4702	3714	4331	3421
4	5951	4701	5581	4409	5207	4114	4817	3805	4447	3513
5	6062	4789	5695	4499	5323	4205	4933	3897	4566	3607
6	6173	4877	5810	4590	5441	4298	5052	3991	4686	3702
7	6284	4964	5926	4681	5559	4392	5171	4085	4807	3798
8	6396	5053	6042	4773	5677	4485	5293	4181	4932	3896
9	6509	5142	6158	4865	5795	4578	5416	4279	5059	3996
10	6621	5231	6274	4956	5914	4672	5541	4378	5187	4098
11	6733	5319	6390	5048	6035	4768	5668	4478	5318	4201
12	6845	5407	6508	5141	6159	4866	5797	4580	5451	4306
13	6957	5496	6627	5235	6285	4965	5928	4683	5586	4413
14	7070	5585	6748	5331	6412	5066	6060	4788	5724	4522
15	7184	5675	6871	5428	6541	5167	6194	4894	5863	4632
16	7298	5766	6994	5525	6671	5270	6330	5001	6005	4744
17	7413	5856	7117	5623	6801	5373	6468	5110	6150	4859
18	7527	5946	7241	5720	6933	5477	6607	5220	6298	4975
19	7642	6037	7366	5819	7066	5582	6747	5330	6447	5093
20	7756	6127	7491	5918	7200	5688	6889	5443	6599	5213
21	7870	6217	7616	6016	7334	5794	7034	5557	6753	5335
22	7982	6306	7740	6115	7469	5901	7180	5672	6911	5459
23	8094	6394	7866	6214	7606	6008	7326	5788	7071	5586
24	8205	6482	7992	6314	7743	6117	7475	5905	7233	5714
25	8316	6570	8118	6413	7881	6226	7625	6024	7397	5844
26	8426	6657	8243	6512	8020	6336	7777	6144	7563	5975
27	8535	6743	8367	6610	8160	6447	7931	6265	7733	6109
28	8643	6828	8492	6708	8301	6558	8086	6388	7904	6244
29	8750	6913	8616	6807	8442	6669	8243	6512	8078	6381
30	8857	6997	8740	6905	8583	6781	8401	6637	8254	6521

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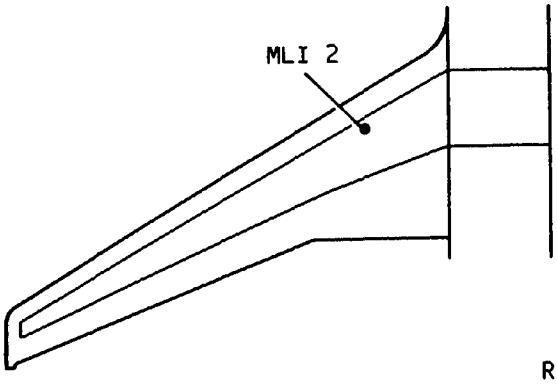
Fuel Quantity Table, MLI 2 - Inner Tank
Figure 332



INNER TANK MLI 2
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

	WING UP				LEVEL		WING DOWN			
MLI	2		1		0		1		2	
READING (INCREMENT)	L	KG	L	KG	L	KG	L	KG	L	KG
31	8963	7080	8863	7002	8725	6893	8560	6763	8433	6662
32	9068	7164	8986	7099	8867	7005	8722	6890	8615	6806
33	9173	7247	9107	7194	9009	7117	8884	7018	8797	6950
34	9277	7329	9226	7289	9151	7229	9047	7147	8980	7094
35	9380	7410	9345	7383	9292	7341	9210	7276	9163	7239
36	9482	7491	9464	7476	9431	7451	9374	7405	9347	7384
37	9584	7572	9581	7569	9569	7560	9538	7535	9531	7530
38	9686	7652	9698	7662	9706	7668	9704	7666	9715	7675
39	9786	7731	9815	7754	9842	7776	9870	7797	9900	7821
40	9885	7809	9931	7845	9978	7882	10035	7928	10084	7966
41	9984	7888	10046	7936	10112	7988	10199	8057	10267	8111
42	10083	7966	10161	8027	10245	8094	10360	8184	10448	8254
43	10182	8044	10274	8117	10377	8198	10520	8311	10629	8397
44	10280	8121	10387	8205	10509	8302	10678	8436	10808	8539
45	10378	8198	10499	8294	10641	8406	10833	8558	10987	8679
46	10475	8275	10611	8382	10771	8509	10985	8678	11162	8818
47	10572	8352	10721	8470	10901	8611	11134	8796	11334	8954
48	10668	8428	10831	8556	11029	8713	11281	8912	11502	9086
49	10764	8503	10940	8643	11156	8813	11425	9026	11665	9215
50	10859	8579	11050	8729	11282	8913	11566	9137	11822	9340
51	10954	8654	11158	8815	11406	9011	11705	9247	11974	9460
52	11048	8728	11266	8900	11530	9108	11840	9354	12121	9576
53	11142	8802	11372	8984	11651	9205	11972	9458	12264	9689
54	11235	8875	11479	9069	11772	9300	12100	9559	12402	9798
55	11328	8949	11586	9153	11890	9393	12225	9658	12536	9904

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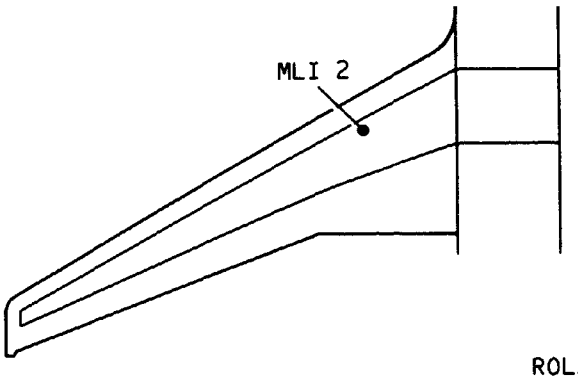
Fuel Quantity Table, MLI 2 - Inner Tank
Figure 333



INNER TANK MLI 2
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

	WING UP				LEVEL		WING DOWN			
MLI	2		1		0		1		2	
READING (INCREMENT)	L	KG	L	KG	L	KG	L	KG	L	KG
0	5377	4248	4986	3939	4616	3647	4221	3334	3852	3043
1	5487	4334	5098	4027	4730	3736	4335	3424	3968	3135
2	5598	4422	5211	4117	4845	3827	4450	3516	4086	3228
3	5710	4511	5325	4207	4961	3919	4568	3609	4206	3323
4	5822	4600	5441	4299	5079	4012	4687	3703	4327	3418
5	5935	4689	5558	4391	5198	4106	4807	3798	4448	3514
6	6049	4779	5676	4484	5318	4202	4928	3893	4571	3611
7	6164	4869	5795	4578	5440	4298	5050	3990	4696	3710
8	6279	4961	5914	4672	5562	4394	5174	4088	4825	3812
9	6395	5052	6034	4767	5686	4492	5301	4188	4958	3917
10	6511	5143	6154	4862	5812	4591	5432	4291	5094	4025
11	6627	5235	6276	4958	5940	4693	5565	4396	5234	4135
12	6743	5327	6400	5056	6070	4796	5701	4504	5376	4247
13	6861	5420	6525	5155	6202	4900	5839	4612	5522	4362
14	6980	5514	6651	5254	6335	5005	5978	4723	5670	4479
15	7099	5608	6778	5354	6471	5112	6121	4835	5821	4599
16	7219	5703	6905	5455	6607	5220	6265	4949	5977	4722
17	7340	5798	7034	5557	6745	5329	6411	5065	6136	4848
18	7461	5894	7165	5660	6883	5438	6560	5182	6299	4976
19	7583	5990	7295	5763	7023	5548	6711	5302	6465	5108
20	7705	6087	7427	5867	7165	5660	6865	5423	6636	5242
21	7827	6183	7560	5972	7308	5773	7021	5547	6811	5381
22	7949	6280	7693	6078	7453	5888	7179	5672	6990	5522
23	8072	6377	7827	6184	7599	6003	7340	5799	7173	5667
24	8194	6473	7962	6290	7745	6119	7504	5928	7359	5813
25	8317	6570	8097	6397	7893	6235	7670	6059	7547	5962
26	8439	6667	8233	6504	8043	6354	7837	6191	7737	6113
27	8561	6764	8370	6613	8195	6474	8007	6325	7929	6264
28	8684	6860	8508	6721	8348	6595	8178	6461	8123	6417
29	8807	6957	8645	6830	8502	6716	8352	6598	8316	6570
30	8929	7054	8784	6940	8657	6839	8529	6738	8510	6723

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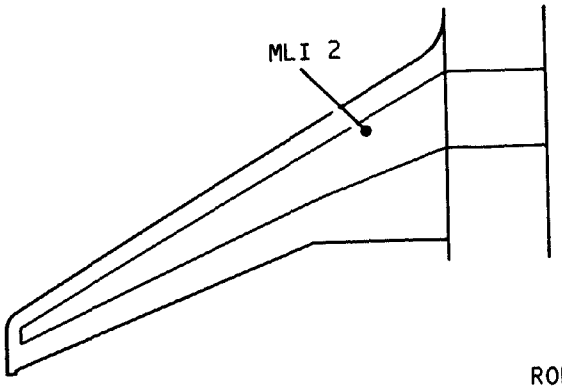
Fuel Quantity Table, MLI 2 - Inner Tank
Figure 334



INNER TANK MLI 2
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
31	9050	7150	8924	7050	8813	6962	8708	6880	8704	6876
32	9170	7244	9063	7160	8971	7087	8889	7022	8900	7031
33	9289	7339	9203	7270	9130	7212	9071	7166	9095	7185
34	9408	7432	9342	7380	9290	7339	9254	7311	9290	7339
35	9526	7526	9482	7491	9451	7466	9438	7456	9483	7492
36	9643	7618	9622	7601	9612	7594	9621	7601	9677	7645
37	9760	7710	9760	7711	9774	7721	9805	7746	9869	7797
38	9875	7801	9898	7819	9936	7850	9987	7890	10060	7948
39	9989	7892	10034	7927	10100	7979	10169	8033	10250	8097
40	10103	7981	10170	8034	10263	8108	10349	8176	10438	8246
41	10216	8071	10304	8140	10426	8236	10529	8318	10626	8394
42	10329	8160	10437	8245	10587	8363	10706	8458	10811	8541
43	10441	8248	10569	8350	10746	8489	10882	8596	10995	8686
44	10551	8336	10701	8454	10903	8614	11055	8734	11178	8831
45	10661	8422	10832	8558	11058	8736	11227	8869	11359	8973
46	10771	8509	10962	8660	11209	8855	11396	9003	11537	9114
47	10880	8595	11091	8762	11356	8971	11562	9134	11713	9253
48	10989	8681	11220	8864	11499	9084	11724	9262	11886	9390
49	11096	8766	11348	8965	11640	9195	11883	9388	12058	9526
50	11203	8851	11473	9064	11777	9304	12038	9510	12226	9659
51	11310	8935	11597	9162	11910	9409	12188	9629	12392	9790
52	11417	9020	11719	9258	12040	9511	12333	9743	12555	9918
53	11524	9104	11839	9353	12166	9611	12472	9853	12714	10044
54	11630	9188	11957	9446	12289	9709	12606	9958	12868	10166
55	11736	9271	12071	9536	12410	9804	12735	10060	13018	10284

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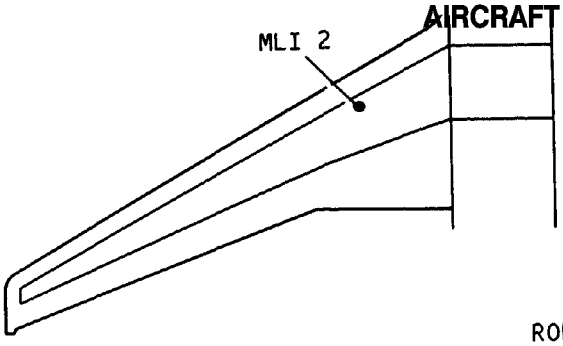
Fuel Quantity Table, MLI 2 - Inner Tank
Figure 335



INNER TANK MLI 2
PITCH ATTITUDE = 2 DEG. (NOSE UP)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2		WING UP 1		LEVEL 0		WING DOWN 1		WING DOWN 2	
	L	KG	L	KG	L	KG	L	KG	L	KG
0	5245	4143	4854	3835	4486	3544	4095	3235	3728	2945
1	5358	4233	4970	3926	4603	3636	4213	3328	3848	3040
2	5472	4323	5086	4018	4722	3730	4333	3423	3971	3137
3	5586	4413	5204	4111	4842	3826	4455	3519	4096	3236
4	5702	4505	5323	4205	4964	3922	4579	3617	4225	3338
5	5819	4597	5443	4300	5088	4019	4706	3717	4358	3442
6	5936	4689	5564	4395	5214	4119	4835	3820	4494	3550
7	6054	4783	5687	4493	5342	4220	4967	3924	4633	3660
8	6174	4878	5812	4591	5472	4323	5101	4030	4775	3772
9	6295	4973	5938	4691	5603	4426	5237	4138	4921	3887
10	6417	5069	6065	4791	5736	4532	5376	4247	5070	4006
11	6539	5166	6193	4893	5871	4638	5518	4359	5226	4128
12	6662	5263	6323	4995	6009	4747	5663	4474	5387	4256
13	6786	5361	6454	5099	6148	4857	5811	4590	5554	4388
14	6911	5459	6586	5203	6289	4968	5962	4710	5728	4525
15	7036	5559	6720	5309	6431	5081	6117	4833	5908	4668
16	7162	5658	6855	5416	6577	5196	6276	4958	6095	4815
17	7289	5758	6992	5523	6724	5312	6437	5085	6286	4966
18	7416	5859	7129	5632	6873	5430	6603	5216	6480	5119
19	7544	5960	7268	5742	7025	5549	6772	5350	6676	5274
20	7673	6062	7408	5852	7178	5671	6946	5487	6874	5431
21	7803	6164	7549	5964	7335	5794	7124	5628	7074	5589
22	7933	6267	7692	6076	7493	5919	7306	5772	7276	5748
23	8063	6370	7836	6190	7653	6046	7493	5919	7477	5907
24	8195	6474	7981	6305	7816	6175	7682	6069	7678	6066
25	8328	6579	8127	6420	7981	6305	7873	6220	7878	6224
26	8461	6684	8273	6536	8149	6437	8066	6372	8079	6382
27	8594	6789	8422	6653	8318	6571	8260	6526	8279	6540
28	8727	6894	8572	6772	8490	6707	8454	6679	8478	6698
29	8862	7001	8724	6892	8664	6845	8648	6832	8676	6854
30	8997	7108	8878	7013	8841	6984	8842	6985	8875	7011

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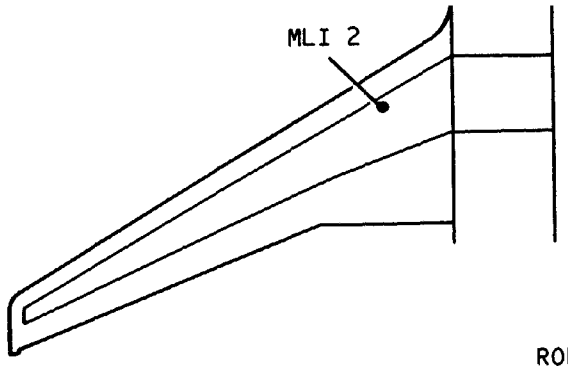
Fuel Quantity Table, MLI 2 - Inner Tank
Figure 336



INNER TANK MLI 2
PITCH ATTITUDE = 2 DEG. (NOSE UP)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2		1		LEVEL 0		1		WING DOWN 2	
	L	KG	L	KG	L	KG	L	KG	L	KG
31	9133	7215	9031	7135	9019	7125	9035	7138	9072	7167
32	9269	7322	9186	7257	9197	7266	9227	7289	9269	7322
33	9405	7430	9343	7381	9376	7407	9417	7439	9465	7477
34	9542	7538	9502	7506	9554	7548	9606	7589	9660	7631
35	9679	7646	9661	7632	9732	7689	9794	7737	9855	7785
36	9815	7754	9821	7759	9910	7829	9981	7885	10048	7938
37	9952	7862	9982	7885	10087	7969	10166	8031	10240	8090
38	10089	7970	10142	8012	10264	8109	10350	8177	10432	8241
39	10225	8078	10303	8139	10440	8248	10533	8321	10621	8391
40	10360	8184	10464	8267	10614	8385	10714	8464	10809	8539
41	10493	8290	10624	8393	10786	8521	10894	8606	10994	8685
42	10625	8394	10782	8518	10956	8655	11072	8747	11176	8829
43	10756	8498	10939	8642	11123	8787	11248	8886	11356	8972
44	10887	8601	11094	8764	11288	8918	11421	9023	11535	9113
45	11018	8704	11246	8884	11451	9046	11593	9159	11712	9253
46	11146	8806	11394	9001	11611	9173	11763	9293	11887	9391
47	11273	8906	11540	9116	11768	9297	11929	9424	12061	9528
48	11399	9905	11681	9228	11922	9418	12093	9554	12233	9664
49	11522	9103	11819	9337	12073	9537	12255	9681	12404	9800
50	11644	9199	11952	9442	12220	9654	12414	9807	12574	9933
51	11765	9294	12082	9545	12363	9767	12569	9930	12740	10065
52	11882	9387	12208	9644	12503	9877	12721	10049	12903	10193
53	11997	9478	12330	9741	12637	9983	12868	10166	13061	10318
54	12109	9566	12449	9835	12764	10084	13012	10279	13213	10439
55	12219	9653	12563	9925	12886	10180	13152	10390	13360	10554

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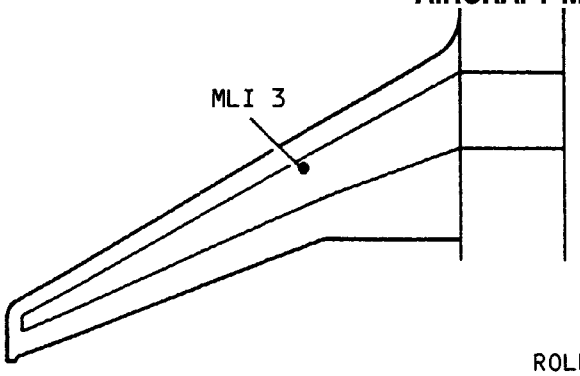
Fuel Quantity Table, MLI 2 - Inner Tank
Figure 337



INNER TANK MLI 3
PITCH ATTITUDE = 2 DEG. (NOSE UP)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
0	10346	8174	9605	7588	8737	6902	7719	6098	6673	5272
1	10478	8278	9763	7713	8912	7041	7909	6248	6869	5426
2	10609	8381	9922	7838	9089	7180	8100	6399	7066	5582
3	10739	8484	10080	7963	9265	7319	8291	6550	7265	5740
4	10868	8586	10239	8089	9441	7459	8483	6702	7465	5897
5	10997	8688	10398	8215	9618	7598	8675	6854	7664	6054
6	11125	8788	10557	8340	9794	7737	8867	7005	7862	6211
7	11250	8888	10714	8464	9969	7876	9058	7155	8060	6368
8	11374	8986	10869	8587	10145	8014	9247	7305	8258	6524
9	11497	9083	11024	8709	10319	8152	9435	7453	8455	6680
10	11618	9178	11175	8828	10493	8289	9622	7601	8652	6835
11	11737	9272	11323	8946	10664	8425	9808	7748	8848	6990
12	11854	9365	11469	9060	10834	8559	9992	7894	9043	7144
13	11968	9455	11611	9173	11001	8691	10176	8039	9238	7298
14	12080	9543	11749	9282	11166	8821	10358	8183	9432	7451
15	12189	9629	11883	9387	11328	8949	10538	8325	9625	7604
16	12296	9713	12013	9490	11489	9076	10717	8467	9817	7756
17	12399	9795	12139	9590	11646	9201	10895	8607	10009	7907
18	12500	9875	12262	9687	11801	9323	11071	8746	10200	8058
19	12598	9952	12382	9782	11952	9442	11245	8883	10389	8207
20	12693	10027	12497	9873	12100	9559	11417	9019	10577	8356
21	12785	10100	12608	9961	12245	9674	11587	9154	10763	8503
22	12874	10171	12716	10046	12387	9785	11755	9286	10947	8648
23	12961	10239	12821	10129	12524	9894	11919	9416	11128	8791
24	13045	10305	12923	10209	12655	9998	12081	9544	11307	8932
25	13125	10368	13019	10285	12781	10097	12241	9671	11484	9072
26	13201	10429	13111	10358	12901	10192	12399	9795	11660	9211
27	13275	10487	13200	10428	13016	10283	12553	9917	11833	9348
28	13346	10543	13286	10496	13127	10370	12704	10036	12005	9484
29	13414	10597	13367	10560	13231	10453	12850	10151	12176	9619
30	13479	10648	13445	10621	13331	10532	12992	10264	12346	9753

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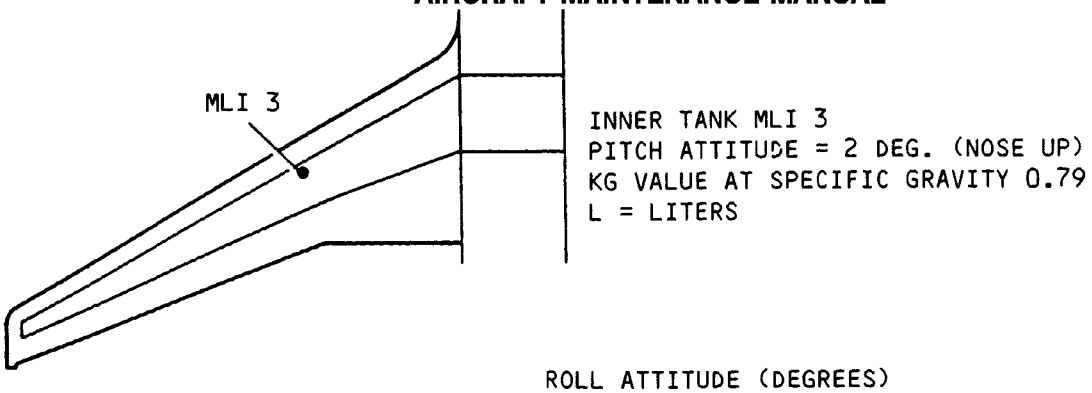
Fuel Quantity Table, MLI 3 - Inner Tank
Figure 338



ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
31	13541	10697	13518	10679	13426	10606	13131	10374	12514	9886
32	13600	10744	13587	10734	13516	10678	13265	10480	12680	10017
33	13657	10789	13653	10786	13601	10745	13394	10581	12842	10145
34	13711	10832	13714	10834	13681	10808	13515	10677	13000	10270
35	13763	10872	13773	10880	13754	10865	13628	10766	13153	10391
36	13811	10911	13827	10923	13820	10918	13731	10848	13301	10508
37	13857	10947	13878	10963	13881	10966	13824	10921	13442	10619
38	13900	10981	13925	11000	13937	11010	13906	10986	13576	10725
39	13941	11013	13969	11035	13986	11049	13976	11041	13701	10824
40	13978	11043	14009	11067	14031	11085	14036	11089	13818	10916

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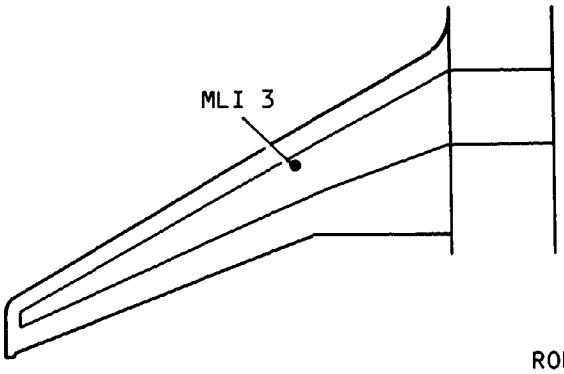
Fuel Quantity Table, MLI 3 - Inner Tank
Figure 339



INNER TANK MLI 3
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
0	10494	8290	9929	7844	9129	7212	8139	6430	7094	5604
1	10603	8377	10064	7950	9288	7337	8312	6566	7276	5748
2	10712	8463	10198	8056	9448	7464	8487	6705	7462	5895
3	10820	8548	10331	8161	9607	7590	8664	6844	7650	6044
4	10928	8633	10462	8265	9768	7716	8842	6985	7840	6194
5	11036	8718	10594	8369	9929	7844	9023	7128	8031	6345
6	11142	8802	10725	8473	10091	7972	9204	7271	8223	6496
7	11248	8886	10854	8575	10253	8100	9386	7415	8416	6648
8	11354	8970	10983	8676	10414	8227	9569	7559	8608	6800
9	11460	9053	11111	8778	10574	8353	9751	7703	8801	6953
10	11566	9137	11239	8878	10732	8478	9932	7846	8995	7106
11	11671	9220	11365	8978	10888	8602	10112	7989	9189	7259
12	11775	9302	11489	9076	11042	8723	10292	8131	9381	7411
13	11878	9383	11612	9173	11192	8842	10470	8271	9573	7563
14	11978	9463	11733	9269	11338	8957	10647	8411	9765	7714
15	12077	9541	11851	9363	11481	9070	10821	8549	9956	7865
16	12174	9617	11967	9454	11621	9181	10994	8685	10144	8014
17	12270	9693	12080	9543	11757	9288	11165	8820	10332	8162
18	12364	9768	12191	9631	11890	9393	11334	8954	10518	8310
19	12457	9841	12298	9715	12019	9495	11500	9085	10704	8456
20	12547	9912	12403	9798	12145	9594	11662	9213	10887	8601
21	12634	9981	12505	9879	12268	9691	11821	9339	11069	8745
22	12719	10048	12604	9957	12388	9786	11977	9462	11250	8887
23	12801	10113	12700	10033	12504	9878	12127	9581	11428	9028
24	12881	10176	12793	10106	12616	9967	12273	9696	11604	9167
25	12958	10237	12882	10177	12725	10053	12414	9807	11777	9304
26	13033	10296	12968	10245	12831	10137	12549	9913	11949	9440
27	13105	10353	13051	10310	12933	10217	12679	10016	12118	9573
28	13174	10408	13132	10374	13030	10294	12804	10115	12285	9705
29	13242	10461	13209	10435	13124	10368	12925	10211	12448	9834
30	13308	10513	13283	10494	13214	10439	13040	10302	12608	9960

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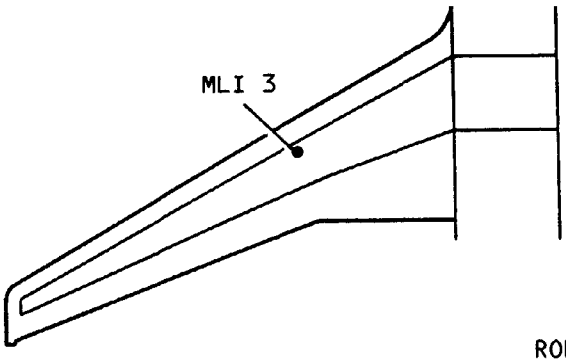
Fuel Quantity Table, MLI 3 - Inner Tank
Figure 340



INNER TANK MLI 3
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	KG	1 K	KG	LEVEL 0 L	KG	1 L	KG	WING DOWN 2 L	KG
31	13371	10563	13354	10550	13300	10507	13151	10389	12764	10084
32	13432	10612	13423	10604	13381	10571	13258	10473	12916	10204
33	13492	10658	13489	10656	13458	10632	13359	10553	13063	10320
34	13549	10704	13552	10706	13531	10689	13454	10629	13203	10431
35	13604	10747	13613	10754	13600	10744	13544	10700	13336	10536
36	13657	10789	13671	10800	13665	10796	13627	10765	13461	10634
37	13708	10829	13726	10843	13728	10845	13705	10827	13578	10727
38	13756	10867	13778	10885	13788	10892	13777	10884	13687	10813
39	13801	10903	13828	10924	13844	10937	13844	10937	13786	10891
40	13845	10937	13875	10961	13897	10979	13906	10986	13875	10961

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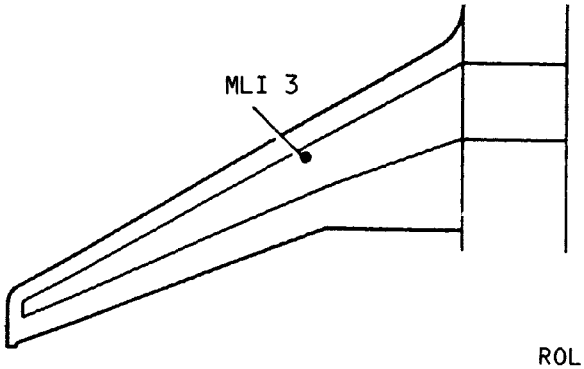
Fuel Quantity Table, MLI 3 - Inner Tank
Figure 341



INNER TANK MLI 3
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2		1		LEVEL 0		1		WING DOWN 2	
	L	KG	L	KG	L	KG	L	KG	L	KG
0	10576	8355	10138	8009	9510	7513	8616	6807	7587	5993
1	10672	8431	10251	8098	9646	7621	8777	6934	7755	6127
2	10767	8506	10363	8187	9782	7728	8939	7062	7926	6262
3	10862	8581	10475	8275	9917	7835	9101	7190	8100	6399
4	10957	8656	10586	8363	10051	7941	9264	7318	8276	6538
5	11050	8730	10696	8450	10184	8046	9427	7447	8454	6679
6	11143	8803	10805	8536	10316	8150	9591	7577	8635	6822
7	11236	8876	10914	8622	10447	8253	9756	7707	8817	6965
8	11328	8949	11023	8708	10578	8357	9921	7838	8999	7109
9	11420	9022	11131	8794	10709	8460	10085	7967	9181	7253
10	11511	9094	11238	8878	10838	8562	10247	8095	9364	7398
11	11602	9165	11345	8962	10966	8663	10407	8222	9548	7543
12	11691	9236	11451	9046	11093	8764	10566	8347	9731	7687
13	11781	9307	11557	9130	11219	8863	10722	8471	9914	7832
14	11869	9377	11662	9213	11344	8961	10876	8592	10097	7977
15	11957	9446	11765	9294	11467	9059	11026	8711	10280	8121
16	12044	9515	11867	9375	11589	9155	11174	8828	10460	8264
17	12131	9583	11968	9454	11709	9250	11320	8943	10639	8405
18	12217	9651	12067	9533	11828	9344	11462	9055	10818	8546
19	12302	9719	12165	9610	11944	9436	11602	9165	10996	8686
20	12385	9784	12261	9686	12058	9526	11739	9274	11170	8824
21	12466	9848	12355	9760	12169	9613	11873	9379	11341	8959
22	12546	9911	12447	9833	12277	9699	12003	9482	11508	9091
23	12623	9973	12536	9904	12384	9783	12130	9583	11670	9219
24	12700	10033	12624	9973	12486	9864	12254	9680	11826	9343
25	12774	10092	12709	10040	12586	9943	12374	9776	11978	9462
26	12847	10149	12791	10105	12683	10020	12491	9868	12124	9578
27	12919	10206	12871	10168	12777	10094	12604	9957	12266	9690
28	12989	10261	12949	10230	12867	10165	12714	10044	12403	9799
29	13057	10315	13025	10290	12955	10234	12820	10128	12537	9904
30	13124	10368	13099	10348	13039	10301	12922	10209	12667	10007

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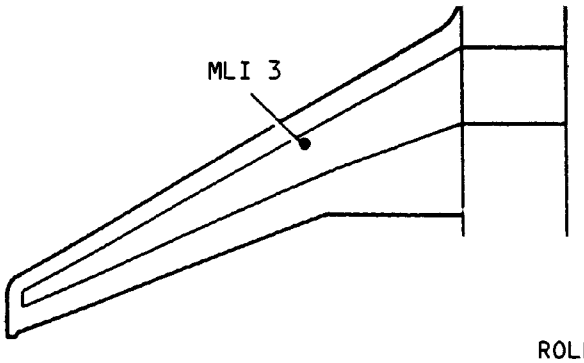
Fuel Quantity Table, MLI 3 - Inner Tank
Figure 342



INNER TANK MLI 3
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	KG	1 L	KG	LEVEL 0 L	KG	1 L	KG	WING DOWN 2 L	KG
31	13189	10419	13170	10404	13121	10365	13021	10286	12793	10106
32	13251	10469	13238	10458	13199	10427	13114	10360	12915	10203
33	13312	10517	13305	10511	13274	10487	13204	10431	13032	10295
34	13371	10563	13370	10562	13346	10543	13290	10499	13143	10383
35	13429	10609	13432	10612	13415	10598	13373	10564	13249	10467
36	13484	10652	13492	10659	13482	10651	13450	10626	13350	10546
37	13538	10695	13550	10704	13547	10702	13524	10684	13445	10622
38	13589	10735	13605	10748	13608	10751	13594	10739	13535	10692
39	13638	10774	13658	10790	13667	10797	13662	10793	13618	10758
40	13685	10811	13709	10830	13723	10842	13726	10843	13697	10821

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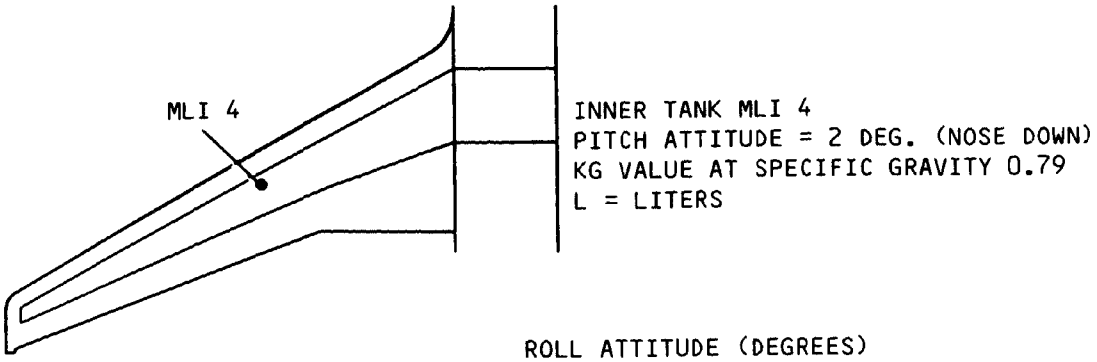
Fuel Quantity Table, MLI 3 - Inner Tank
Figure 343



ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
0	12500	9875	12113	9569	11531	9110	10659	8420	9303	7350
1	12579	9937	12210	9646	11652	9205	10813	8543	9487	7494
2	12656	9998	12305	9721	11772	9300	10965	8662	9670	7639
3	12731	10058	12398	9794	11889	9392	11114	8780	9853	7784
4	12805	10116	12489	9866	12004	9483	11261	8896	10037	7929
5	12877	10173	12577	9936	12116	9572	11405	9010	10220	8073
6	12948	10229	12664	10005	12226	9658	11545	9121	10401	8217
7	13018	10284	12748	10071	12333	9743	11683	9230	10580	8358
8	13085	10338	12829	10135	12438	9826	11819	9337	10759	8500
9	13151	10390	12907	10197	12539	9906	11950	9441	10938	8641
10	13215	10440	12984	10258	12637	9984	12079	9542	11113	8779
11	13277	10489	13059	10317	12733	10059	12204	9641	11285	8915
12	13337	10536	13132	10374	12825	10131	12326	9737	11454	9048
13	13396	10583	13202	10429	12914	10202	12444	9831	11618	9178
14	13452	10627	13269	10483	12999	10270	12559	9921	11776	9303
15	13507	10670	13335	10535	13082	10335	12670	10009	11929	9424
16	13559	10712	13399	10585	13162	10398	12777	10094	12077	9541
17	13610	10752	13460	10634	13239	10459	12881	10176	12220	9654
18	13658	10790	13519	10680	13312	10517	12981	10255	12359	9764
19	13704	10827	13576	10725	13383	10572	13077	10331	12494	9870
20	13749	10862	13630	10768	13451	10626	13168	10403	12625	9974
21	13792	10895	13682	10809	13517	10678	13256	10472	12753	10074
22	13832	10927	13732	10848	13580	10728	13340	10539	12876	10172
23	13870	10957	13780	10886	13640	10775	13420	10601	12995	10266
24	13906	10986	13825	10921	13697	10821	13495	10661	13108	10355
25	13941	11013	13867	10955	13752	10864	13566	10717	13216	10440
26	13973	11039	13908	10987	13804	10905	13635	10772	13318	10521
27	14003	11062	13946	11017	13853	10944	13700	10823	13416	10598
28	14030	11084	13980	11045	13898	10980	13762	10872	13507	10670
29	14056	11105	14013	11070	13942	11014	13821	10918	13592	10738
30	14081	11124	14043	11094	13982	11046	13876	10962	13672	10801

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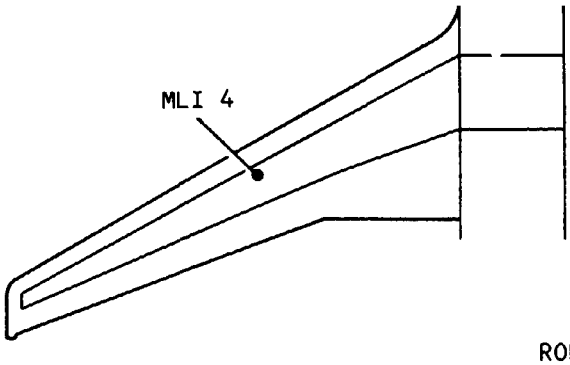
Fuel Quantity Table, MLI 4 - Inner Tank
Figure 344



INNER TANK MLI 4
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

	WING UP				LEVEL		WING DOWN			
MLI	2		1		0		1		2	
READING (INCREMENT)	L	KG	L	KG	L	KG	L	KG	L	KG
31	14104	11142	14071	11116	14019	11075	13927	11002	13748	10861
32	14124	11158	14097	11137	14052	11101	13975	11040	13818	10916
33	14143	11173	14120	11155	14083	11125	14018	11075	13883	10967
34	14159	11185	14141	11171	14110	11147	14057	11105	13943	11015
35	14172	11196	14159	11186	14135	11166	14092	11132	13998	11058

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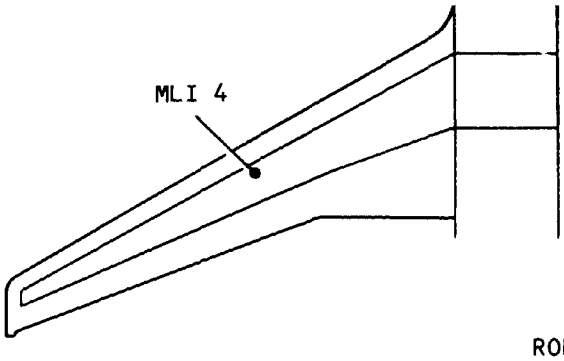
Fuel Quantity Table, MLI 4 - Inner Tank
Figure 345



INNER TANK MLI 4
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
0	12373	9775	11867	9375	11069	8745	9794	7737	8282	6543
1	12466	9848	11982	9466	11218	8863	9975	7880	8474	6695
2	12555	9919	12095	9555	11364	8978	10156	8023	8667	6847
3	12642	9987	12205	9642	11507	9090	10335	8165	8861	7000
4	12727	10054	12312	9726	11646	9200	10513	8305	9055	7154
5	12809	10119	12416	9809	11782	9308	10689	8445	9249	7306
6	12888	10182	12518	9889	11914	9412	10864	8582	9441	7458
7	12965	10243	12616	9967	12042	9514	11036	8719	9633	7610
8	13040	10301	12712	10043	12168	9612	11207	8853	9825	7762
9	13111	10358	12805	10116	12290	9709	11375	8986	10015	7912
10	13181	10413	12894	12894	10186	9804	11540	9117	10204	8061
11	13248	10466	12980	10254	12525	9895	11702	9245	10391	8209
12	13314	10518	13062	10319	12637	9983	11860	9370	10577	8356
13	13377	10568	13142	10382	12745	10069	12015	9492	10762	8502
14	13438	10616	13219	10443	12851	10152	12164	9610	10946	8647
15	13497	10663	13293	10501	12952	10232	12309	9724	11128	8791
16	13554	10708	13364	10557	13048	10308	12448	9834	11308	8933
17	13609	10751	13432	10611	13141	10381	12582	9940	11485	9073
18	13662	10793	13498	10663	13231	10453	12711	10042	11660	9212
19	13713	10833	13561	10713	13316	10520	12835	10140	11833	9348
20	13760	10871	13621	10761	13396	10583	12955	10234	12004	9484
21	13806	10907	13678	10806	13472	10643	13069	10325	12173	9617
22	13849	10941	13733	10849	13545	10700	13179	10411	12339	9748
23	13890	10973	13786	10891	13613	10754	13284	10494	12501	9876
24	13927	11003	13835	10930	13678	10805	13384	10573	12660	10002
25	13963	11031	13881	10966	13740	10854	13478	10648	12815	10124
26	13996	11057	13925	11000	13799	10901	13566	10717	12966	10243
27	14027	11082	13965	11032	13855	10945	13648	10782	13111	10357
28	14056	11104	14002	11062	13907	10986	13724	10842	13249	10467
29	14082	11125	14037	11089	13955	11024	13795	10898	13379	10570
30	14106	11143	14068	11114	13999	11059	13861	10950	13501	10666

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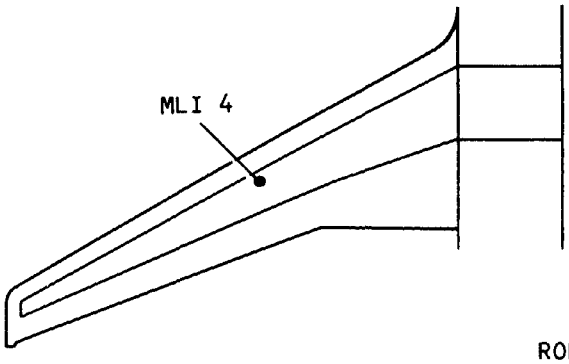
Fuel Quantity Table, MLI 4 - Inner Tank
Figure 346



INNER TANK MLI 4
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	WING UP 1 L	WING UP 1 KG	LEVEL 0 L	LEVEL 0 KG	WING DOWN 1 L	WING DOWN 1 KG	WING DOWN 2 L	WING DOWN 2 KG
31	14127	11160	14096	11136	14039	11091	13922	10998	13616	10756
32	14146	11175	14121	11156	14075	11119	13978	11042	13722	10840
33	14162	11188	14143	11173	14107	11144	14028	11082	13818	10916
34	14176	11199	14162	11188	14134	11166	14074	11118	13903	10983
35	14188	11209	14177	11200	14157	11184	14113	11149	13977	11042

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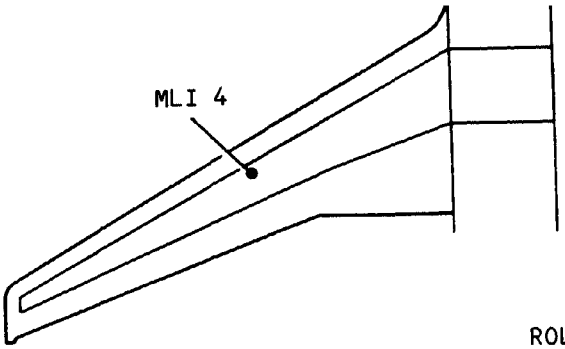
Fuel Quantity Table, MLI 4 - Inner Tank
Figure 347



ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2		WING UP 1		LEVEL 0		WING DOWN 1		WING DOWN 2	
	L	KG	L	KG	L	KG	L	KG	L	KG
0	12161	9607	11435	9033	10285	8125	8839	6983	7248	5726
1	12268	9692	11578	9147	10459	8263	9031	7134	7448	5884
2	12372	9774	11717	9257	10631	8399	9220	7284	7647	6041
3	12474	9855	11852	9363	10801	8533	9409	7433	7846	6198
4	12573	9932	11983	9466	10969	8666	9596	7581	8044	6355
5	12668	10008	12110	9567	11135	8796	9782	7728	8243	6512
6	12761	10081	12234	9665	11298	8925	9968	7874	8440	6668
7	12851	10152	12355	9760	11459	9052	10151	8019	8637	6823
8	12939	10222	12471	9852	11617	9178	10334	8163	8833	6978
9	13024	10289	12584	9941	11773	9300	10514	8306	9029	7133
10	13105	10353	12692	10027	11925	9421	10694	8448	9224	7287
11	13182	10414	12798	10110	12074	9538	10872	8589	9418	7441
12	13257	10473	12900	10191	12219	9653	11049	8729	9612	7594
13	13328	10529	12998	10268	12362	9766	11223	8866	9805	7746
14	13397	10584	13091	10342	12500	9875	11395	9002	9997	7898
15	13462	10635	13181	10413	12633	9980	11566	9137	10188	8048
16	13525	10685	13267	10481	12759	10080	11734	9270	10377	8198
17	13585	10732	13350	10546	12880	10175	11900	9401	10566	8347
18	13643	10778	13428	10608	12996	10267	12062	9529	10753	8495
19	13698	10821	13503	10667	13108	10355	12223	9656	10937	8640
20	13750	10863	13573	10722	13214	10439	12381	9781	11118	8783
21	13800	10902	13639	10775	13315	10536	12536	9903	11297	8925
22	13846	10939	13702	10824	13410	10594	12687	10023	11475	9065
23	13890	10973	13761	10871	13501	10666	12834	10139	11651	9204
24	13931	11006	13816	10915	13587	10734	12977	10252	11825	9342
25	13969	11036	13867	10955	13668	10798	13116	10362	11997	9478
26	14004	11063	13915	10993	13742	10856	13251	10469	12169	9613
27	14037	11089	13960	11028	13810	10910	13381	10571	12339	9748
28	14066	11112	14001	11061	13872	10959	13503	10667	12507	9881
29	14092	11133	14039	11091	13928	11003	13617	10757	12673	10012
30	14116	11151	14072	11117	13979	11043	13721	10840	12836	10140

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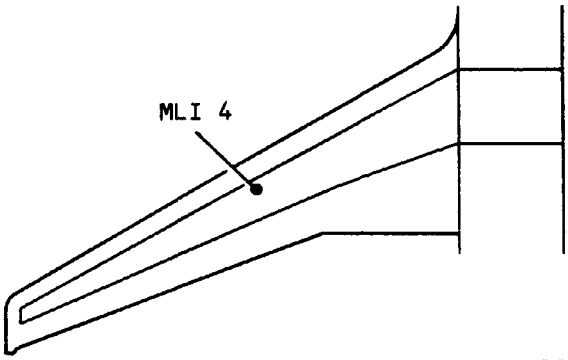
Fuel Quantity Table, MLI 4 - Inner Tank
Figure 348



ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	WING UP 2 L	WING UP 2 KG	1 L	1 KG	LEVEL 0 L	LEVEL 0 KG	1 L	WING DOWN 1 KG	2 L	WING DOWN 2 KG
31	14137	11168	14102	11140	14025	11079	13815	10914	12995	10266
32	14155	11182	14127	11160	14066	11112	13898	10980	13148	10387
33	14170	11195	14149	11178	14102	11141	13970	11036	13296	10504
34	14183	11205	14168	11192	14133	11165	14031	11085	13437	10616
35	14194	11213	14183	11205	14159	11185	14082	11125	13572	10722

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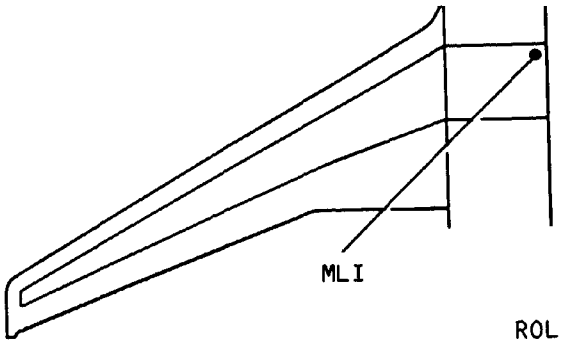
Fuel Quantity Table, MLI 4 - Inner Tank
Figure 349



CENTER TANK MLI
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	LEFT WING UP 2 L	KG	1 L	KG	LEVEL 0 L	KG	LEFT WING DOWN 1 L	KG	2 L	KG
0					231	183	898	709	1586	1253
1			6	5	363	287	1049	828	1739	1374
2			86	68	506	399	1206	952	1890	1493
3	28	22	176	139	658	520	1369	1081	2044	1615
4	90	71	274	217	818	646	1536	1214	2203	1741
5	160	127	387	306	981	775	1707	1349	2370	1872
6	239	189	519	410	1148	907	1880	1485	2542	2008
7	327	258	669	528	1318	1041	2053	1622	2717	2147
8	424	335	832	657	1490	1177	2226	1758	2891	2284
9	530	419	998	788	1663	1314	2399	1895	3065	2421
10	645	509	1161	917	1837	1451	2572	2032	3240	2559
11	768	607	1326	1048	2010	1588	2747	2170	3414	2697
12	903	713	1495	1181	2183	1725	2921	2307	3588	2835
13	1047	827	1666	1316	2357	1862	3094	2444	3762	2972
14	1200	948	1838	1452	2531	2000	3268	2582	3937	3110
15	1356	1071	2010	1588	2705	2137	3442	2719	4111	3248
16	1513	1195	2183	1725	2879	2274	3616	2857	4286	3386
17	1667	1317	2357	1862	3053	2411	3791	2995	4460	3524
18	1818	1437	2531	1999	3227	2549	3965	3132	4635	3662
19	1970	1556	2704	2137	3401	2687	4138	3269	4809	3799
20	2126	1680	2879	2274	3575	2824	4313	3407	4984	3937
21	2289	1809	3053	2412	3749	2962	4487	3545	5158	4075
22	2459	1943	3226	2549	3923	3099	4662	3683	5333	4213
23	2633	2080	3400	2686	4097	3237	4835	3820	5507	4351
24	2807	2217	3574	2824	4271	3374	5009	3957	5682	4489
25	2981	2355	3748	2961	4446	3512	5184	4095	5856	4627
26	3155	2492	3921	3098	4620	3650	5358	4233	6031	4764
27	3330	2630	4095	3235	4794	3787	5531	4370	6205	4902
28	3504	2768	4270	3373	4968	3925	5705	4507	6381	5041
29	3678	2905	4444	3511	5142	4062	5880	4645	6556	5179
30	3852	3043	4618	3648	5316	4200	6054	4783	6730	5317

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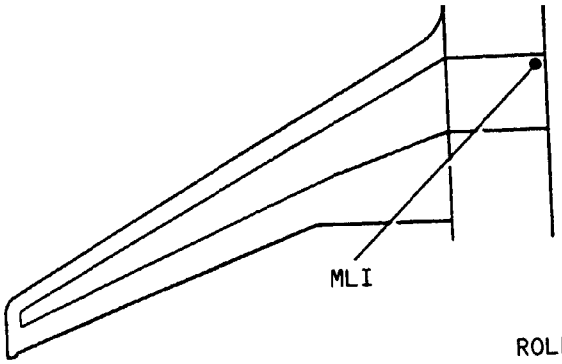
Fuel Quantity Table, MLI - Center Tank
Figure 350



CENTER TANK MLI
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	LEFT WING UP 2 L	KG	LEFT WING UP 1 L	KG	LEVEL 0 L	KG	LEFT WING DOWN 1 L	KG	LEFT WING DOWN 2 L	KG
31	4027	3181	4792	3785	5490	4337	6228	4920	6905	5455
32	4201	3319	4966	3923	5664	4475	6402	5057	7079	5592
33	4376	3457	5141	4061	5838	4612	6577	5195	7254	5730
34	4550	3595	5314	4198	6013	4750	6751	5333	7428	5868
35	4725	3733	5488	4336	6187	4888	6924	5470	7603	6006
36	4899	3870	5663	4474	6362	5026	7098	5607	7777	6144
37	5074	4008	5837	4611	6536	5163	7273	5745	7952	6282
38	5248	4146	6011	4748	6709	5300	7447	5883	8126	6420
39	5423	4284	6184	4886	6884	5438	7621	6021	8301	6558
40	5597	4422	6359	5024	7058	5576	7795	6158	8475	6695
41	5772	4560	6534	5162	7233	5714	7969	6296	8650	6833
42	5946	4698	6707	5299	7407	5851	8144	6433	8825	6972
43	6121	4835	6881	5436	7581	5989	8318	6571	9000	7110
44	6296	4974	7056	5574	7755	6126	8492	6708	9174	7248
45	6471	5112	7230	5712	7929	6264	8666	6846	9349	7386
46	6645	5250	7403	5849	8103	6401	8840	6984	9523	7523
47	6820	5388	7577	5986	8277	6539	9014	7121	9698	7661
48	6994	5526	7752	6124	8451	6676	9188	7259	9872	7799
49	7169	5664	7926	6262	8625	6814	9362	7396	10047	7937
50	7344	5801	8101	6399	8800	6952	9536	7534	10221	8075
51	7518	5939	8274	6537	8974	7089	9710	7671	10396	8213
52	7692	6077	8448	6674	9148	7227	9884	7809	10571	8351
53	7867	6215	8623	6812	9322	7364	10059	7946	10745	8489
54	8042	6353	8798	6950	9496	7502	10233	8084	10919	8626
55	8216	6491	8972	7088	9670	7639	10407	8221	11094	8764
56	8390	6628	9145	7225	9844	7777	10581	8359	11269	8903
57	8565	6766	9319	7362	10018	7915	10755	8496	11444	9041
58	8740	6904	9494	7500	10192	8052	10929	8634	11619	9179
59	8915	7043	9668	7638	10367	8190	11103	8771	11793	9316
60	9090	7181	9842	7775	10541	8327	11277	8909	11968	9454

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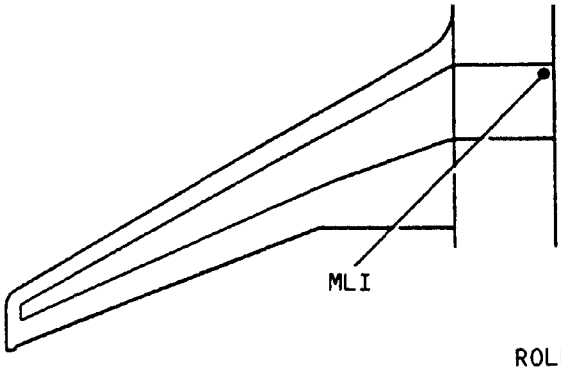
Fuel Quantity Table, MLI - Center Tank
Figure 351



CENTER TANK MLI
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	LEFT WING UP 2		LEFT WING UP 1		LEVEL 0		LEFT WING DOWN 1		LEFT WING DOWN 2	
	L	KG	L	KG	L	KG	L	KG	L	KG
61	9264	7319	10015	7912	10715	8465	11452	9047	12142	9592
62	9439	7457	10189	8050	10889	8602	11626	9185	12317	9730
63	9613	7594	10364	8187	11063	8740	11800	9322	12491	9868
64	9788	7732	10538	8325	11237	8877	11974	9459	12666	10006
65	9962	7870	10712	8462	11411	9015	12148	9597	12840	10144
66	10137	8008	10887	8600	11585	9152	12323	9735	13015	10282
67	10311	8146	11061	8738	11759	9290	12497	9873	13189	10420
68	10486	8284	11234	8875	11934	9428	12671	10010	13364	10557
69	10660	8422	11408	9012	12108	9565	12845	10147	13538	10695
70	10835	8559	11583	9151	12282	9703	13019	10285	13713	10834
71	11009	8697	11757	9288	12456	9840	13193	10423	13888	10972
72	11184	8835	11931	9425	12630	9978	13367	10560	14063	11110
73	11359	8974	12105	9563	12804	10115	13541	10698	14237	11247
74	11534	9112	12279	9701	12978	10253	13715	10835	14412	11385
75	11708	9250	12454	9838	13153	10391	13890	10973	14586	11523
76	11883	9388	12627	9975	13327	10528	14064	11110	14761	11661
77	12057	9525	12801	10113	13501	10666	14238	11248	14935	11799
78	12232	9663	12976	10251	13675	10803	14412	11385	15110	11937
79	12406	9801	13150	10389	13849	10941	14586	11523	15284	12075
80	12581	9939	13324	10526	14023	11078	14760	11660	15458	12212
81	12756	10077	13497	10663	14197	11216	14934	11798	15631	12349
82	12930	10215	13672	10801	14371	11353	15108	11936	15804	12485
83	13105	10353	13847	10939	14545	11491	15283	12074	15975	12621
84	13279	10490	14020	11076	14720	11628	15457	12211	16146	12756
85	13454	10628	14194	11213	14894	11766	15631	12348	16316	12889
86	13628	10766	14368	11350	15068	11904	15805	12486	16482	13021
87	13803	10905	14542	11488	15242	12041	15979	12624	16647	13151
88	13978	11043	14716	11626	15416	12179	16152	12760	16810	13280
89	14153	11181	14890	11763	15590	12316	16323	12895	16971	13407
90	14327	11318	15065	11901	15764	12454	16500	13035	17130	13532

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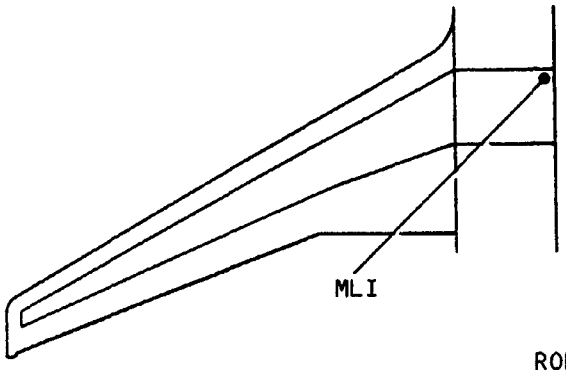
Fuel Quantity Table, MLI - Center Tank
Figure 352



CENTER TANK MLI
PITCH ATTITUDE = 2 DEG. (NOSE DOWN)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	LEFT WING UP 2		LEFT WING UP 1		LEVEL 0		LEFT WING DOWN 1		LEFT WING DOWN 2	
	L	KG	L	KG	L	KG	L	KG	L	KG
91	14502	11456	15239	12039	15938	12591	16679	13176	17285	13655
92	14676	11594	15413	12176	16113	12729	16848	13310	17438	13776
93	14851	11732	15586	12313	16287	12867	17006	13435	17587	13894
94	15025	11870	15761	12451	16461	13004	17164	13559	17733	14009
95	15200	12008	15936	12589	16635	13141	17324	13686	17874	14121
96	15374	12146	16109	12726	16807	13278	17481	13810	18013	14230
97	15548	12283	16283	12863	16978	13413	17633	13930	18147	14336
98	15722	12420	16456	13001	17146	13545	17780	14046	18277	14439
99	15895	12557	16629	13137	17309	13674	17923	14159	18402	14537
100	16067	12693	16798	13271	17467	13799	18061	14268	18522	14632
101	16238	12828	16966	13403	17620	13920	18195	14374	18637	14723
102	16408	12962	17132	13534	17768	14037	18325	14476	18747	14810
103	16575	13094	17295	13663	17912	14150	18449	14575	18852	14893
104	16741	13225	17453	13788	18051	14260	18569	14669	18952	14972
105	16905	13355	17605	13908	18184	14366	18684	14760	19046	15047
106	17067	13483	17753	14025	18313	14467	18794	14847	19135	15116
107	17226	13609	17896	14138	18437	14565	18900	14931	19217	15182
108	17382	13731	18035	14247	18557	14660	19000	15010	19293	15242
109	17532	13850	18167	14352	18672	14751	19096	15086	19363	15297
110	17678	13965	18295	14453	18783	14839	19187	15158	19426	15347

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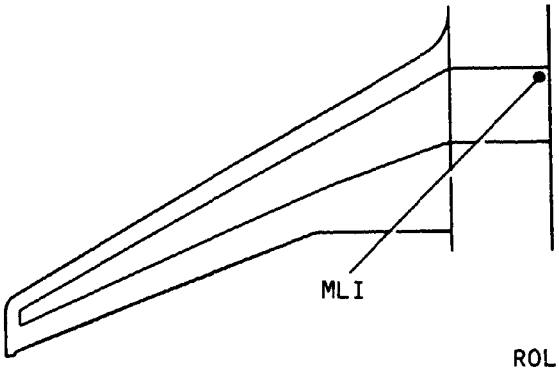
Fuel Quantity Table, MLI - Center Tank
Figure 353



CENTER TANK MLI
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENTS)	LEFT WING UP 2 L	KG	1 L	KG	LEVEL 0 L	KG	LEFT WING DOWN 1 L	KG	2 L	KG
0			44	35	500	395	1088	859	1762	1392
1	4	3	133	105	639	505	1239	979	1923	1519
2	61	48	238	188	781	617	1393	1101	2086	1648
3	126	100	358	283	927	732	1551	1225	2251	1778
4	199	157	489	386	1076	850	1712	1353	2417	1909
5	279	221	628	496	1229	971	1876	1482	2585	2042
6	368	291	770	608	1385	1094	2042	1613	2754	2175
7	465	367	914	722	1544	1219	2210	1746	2924	2310
8	570	451	1061	839	1704	1346	2379	1879	3095	2445
9	684	541	1212	957	1867	1475	2549	2014	3267	2581
10	808	638	1365	1079	2033	1606	2721	2150	3440	2717
11	941	743	1522	1202	2202	1740	2894	2286	3613	2854
12	1081	854	1682	1328	2373	1875	3067	2423	3786	2991
13	1227	970	1844	1457	2546	2011	3241	2560	3960	3128
14	1377	1088	2010	1588	2719	2148	3415	2698	4134	3265
15	1530	1209	2177	1720	2892	2285	3588	2835	4307	3403
16	1686	1332	2346	1853	3065	2422	3762	2972	4481	3540
17	1846	1458	2516	1988	3239	2558	3936	3110	4655	3678
18	2008	1586	2688	2123	3412	2696	4110	3247	4829	3815
19	2172	1716	2860	2260	3586	2833	4285	3385	5003	3952
20	2337	1846	3034	2396	3760	2970	4459	3522	5176	4089
21	2504	1978	3207	2534	3933	3107	4633	3660	5351	4227
22	2672	2111	3381	2671	4107	3245	4806	3797	5525	4365
23	2842	2245	3555	2808	4281	3382	4980	3935	5699	4502
24	3013	2380	3728	2945	4455	3520	5155	4072	5873	4640
25	3184	2516	3902	3083	4629	3657	5329	4210	6047	4777
26	3356	2652	4076	3220	4803	3794	5503	4347	6221	4915
27	3529	2788	4250	3357	4977	3932	5677	4485	6395	5052
28	3703	2925	4423	3495	5151	4069	5851	4623	6569	5190
29	3876	3062	4598	3632	5325	4207	6026	4760	6744	5327
30	4050	3199	4772	3770	5499	4344	6200	4898	6918	5465

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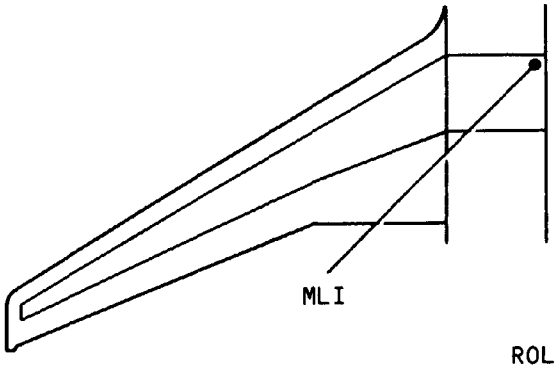
Fuel Quantity Table, MLI - Center Tank
Figure 354



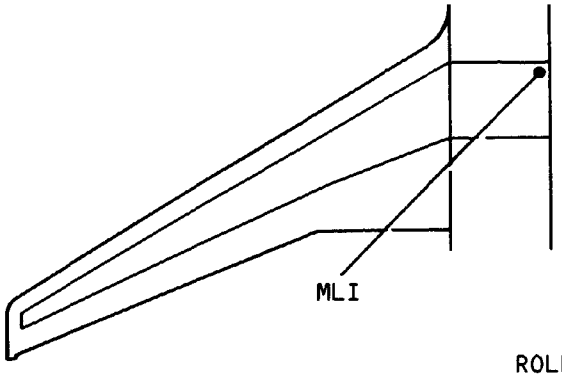
CENTER TANK MLI
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	LEFT WING UP 2		LEFT WING UP 1		LEVEL 0		LEFT WING DOWN 1		LEFT WING DOWN 2	
	L	KG	L	KG	L	KG	L	KG	L	KG
31	4223	3337	4946	3907	5673	4481	6374	5035	7092	5603
32	4397	3474	5120	4045	5846	4619	6548	5173	7266	5740
33	4571	3611	5295	4183	6020	4756	6722	5311	7440	5878
34	4745	3749	5469	4320	6195	4894	6897	5448	7614	6015
35	4919	3886	5642	4457	6369	5031	7071	5586	7788	6153
36	5093	4023	5816	4595	6542	5168	7245	5724	7962	6290
37	5267	4161	5990	4732	6716	5306	7419	5861	8137	6428
38	5441	4298	6165	4870	6890	5443	7593	5999	8311	6565
39	5615	4436	6339	5008	7065	5581	7768	6136	8485	6703
40	5789	4573	6513	5145	7238	5718	7942	6274	8659	6841
41	5963	4711	6687	5283	7412	5856	8116	6412	8833	6978
42	6137	4848	6861	5420	7586	5993	8290	6549	9007	7116
43	6311	4986	7035	5558	7761	6131	8464	6687	9181	7253
44	6485	5123	7210	5696	7934	6268	8639	6825	9355	7391
45	6660	5261	7384	5833	8108	6405	8813	6962	9529	7528
46	6834	5399	7558	5971	8281	6542	8987	7100	9704	7666
47	7008	5536	7732	6109	8455	6680	9161	7237	9878	7803
48	7182	5674	7907	6246	8630	6817	9335	7375	10052	7941
49	7356	5811	8081	6384	8804	6955	9510	7513	10226	8079
50	7530	5949	8255	6521	8977	7092	9684	7650	10400	8216
51	7704	6086	8429	6659	9151	7230	9858	7788	10574	8354
52	7878	6224	8603	6796	9326	7367	10032	7925	10748	8491
53	8052	6361	8777	6934	9500	7505	10206	8063	10922	8629
54	8227	6499	8951	7071	9673	7642	10381	8201	11097	8766
55	8401	6637	9125	7209	9847	7779	10555	8338	11271	8904
56	8575	6674	9299	7346	10021	7916	10729	8476	11445	9041
57	8749	6912	9473	7484	10195	8054	10903	8614	11619	9179
58	8923	7049	9647	7612	10369	8191	11077	8751	11793	9317
59	9097	7187	9822	7759	10543	8329	11252	8889	11967	9454
60	9271	7324	9996	7897	10717	8466	11426	9026	12141	9592

BM7 12 11 28 3 JLMO/09

Fuel Quantity Table, MLI - Center Tank
Figure 355



CENTER TANK MLI
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	LEFT WING UP 2 L	KG	LEFT WING UP 1 L	KG	LEVEL 0 L	KG	LEFT WING DOWN 1 L	KG	LEFT WING DOWN 2 L	KG
61	9445	7462	10170	8034	10891	8604	11600	9164	12315	9729
62	9620	7599	10344	8172	11065	8741	11774	9302	12490	9867
63	9794	7737	10518	8310	11239	8879	11948	9439	12664	10005
64	9968	7875	10693	8447	11413	9016	12123	9577	12839	10143
65	10142	8012	10867	8585	11586	9153	12297	9714	13013	10280
66	10316	8150	11041	8722	11761	9291	12471	9852	13187	10418
67	10490	8287	11214	8859	11935	9429	12645	9990	13361	10555
68	10664	8425	11388	8997	12109	9566	12819	10127	13535	10693
69	10838	8562	11563	9134	12282	9703	12994	10265	13709	10830
70	11012	8700	11737	9272	12456	9840	13168	10403	13883	10968
71	11187	8837	11911	9410	12630	9978	13342	10540	14058	11105
72	11361	8975	12085	9547	12804	10115	13516	10678	14231	11243
73	11535	9113	12259	9685	12978	10253	13690	10815	14405	11380
74	11709	9250	12434	9823	13152	10390	13865	10953	14579	11517
75	11883	9388	12608	9960	13326	10527	14039	11091	14752	11654
76	12057	9525	12782	10098	13500	10665	14213	11228	14926	11791
77	12231	9663	12956	10235	13674	10802	14387	11366	15098	11927
78	12405	9800	13130	10373	13848	10940	14561	11503	15269	12063
79	12580	9938	13305	10511	14022	11077	14735	11641	15440	12197
80	12754	10075	13479	10648	14196	11215	14910	11779	15609	12331
81	12928	10213	13653	10786	14370	11352	15084	11916	15777	12463
82	13102	10351	13827	10923	14544	11490	15258	12054	15942	12595
83	13276	10488	14001	11060	14717	11627	15432	12191	16107	12724
84	13450	10626	14174	11198	14891	11764	15605	12328	16269	12852
85	13624	10763	14349	11336	15065	11901	15777	12464	16428	12978
86	13799	10901	14523	11473	15239	12039	15947	12598	16585	13102
87	13973	11038	14697	11611	15413	12176	16116	12731	16739	13224
88	14147	11176	14871	11748	15587	12314	16282	12863	16890	13343
89	14321	11313	15046	11886	15761	12451	16446	12992	17039	13461
90	14495	11451	15220	12024	15934	12588	16607	13119	17184	13575

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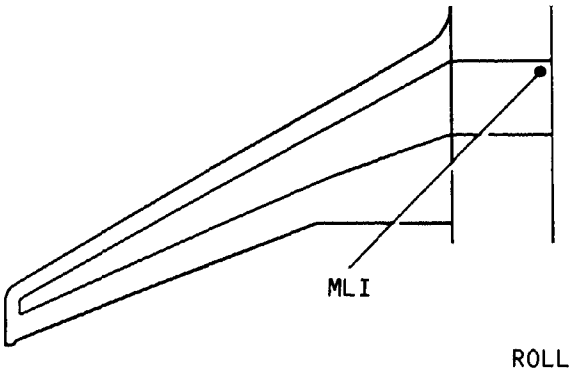
Fuel Quantity Table, MLI - Center Tank
Figure 356



CENTER TANK MLI
PITCH ATTITUDE = 0 DEG. (LEVEL)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	LEFT WING UP 2		LEFT WING UP 1		LEVEL 0		LEFT WING DOWN 1		LEFT WING DOWN 2	
	L	KG	L	KG	L	KG	L	KG	L	KG
91	14669	11588	15393	12161	16105	12723	16764	13244	17325	13687
92	14842	11725	15566	12297	16273	12856	16918	13365	17463	13796
93	15015	11862	15738	12433	16438	12986	17069	13484	17598	13902
94	15187	11997	15909	12568	16600	13114	17215	13600	17729	14006
95	15357	12132	16078	12702	16759	13239	17358	13713	17856	14106
96	15527	12266	16245	12834	16913	13361	17496	13822	17979	14204
97	15695	12399	16410	12964	17064	13481	17632	13929	18099	14298
98	15862	12531	16572	13092	17212	13598	17763	14033	18215	14390
99	16027	12661	16730	13217	17356	13711	17890	14133	18328	14479
100	16190	12790	16885	13339	17496	13822	18014	14231	18437	14565
101	16352	12918	17037	13459	17633	13930	18134	14326	18541	14648
102	16511	13044	17185	13576	17765	14034	18251	14418	18642	14728
103	16668	13168	17330	13691	17893	14135	18363	14507	18740	14805
104	16822	13289	17471	13802	18017	14234	18472	14593	18834	14878
105	16973	13408	17609	13911	18138	14329	18577	14675	18922	14949
106	17121	13525	17743	14017	18254	14420	18677	14755	19007	15016
107	17266	13640	17872	14119	18366	14509	18775	14832	19088	15080
108	17408	13752	17997	14217	18474	14594	18868	14906	19165	15140
109	17546	13861	18117	14313	18579	14677	18957	14976	19237	15197
110	17681	13968	18233	14404	18679	14757	19043	15044	19304	15250

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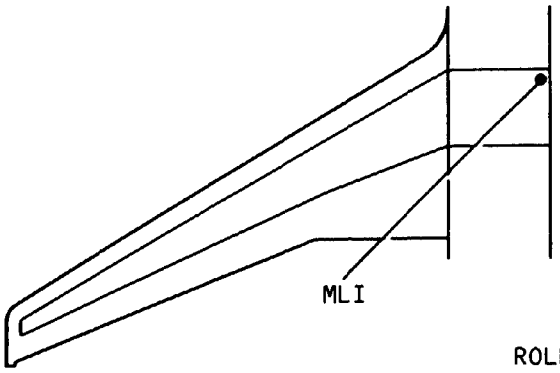
Fuel Quantity Table, MLI - Center Tank
Figure 357



CENTER TANK MLI
PITCH ATTITUDE = 2 DEG. (NOSE UP)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	LEFT WING UP 2		LEFT WING UP 1		LEVEL 0		LEFT WING DOWN 1		LEFT WING DOWN 2	
	L	KG	L	KG	L	KG	L	KG	L	KG
0	91	72	298	236	764	604	1343	1061	1985	1568
1	155	122	408	322	896	708	1486	1174	2139	1690
2	225	178	524	414	1031	814	1633	1290	2295	1813
3	304	240	645	510	1169	923	1782	1408	2453	1938
4	389	308	771	609	1310	1035	1933	1527	2613	2064
5	482	381	901	712	1454	1148	2086	1648	2775	2193
6	583	460	1034	817	1600	1264	2243	1772	2939	2322
7	691	546	1169	924	1749	1382	2402	1897	3105	2453
8	807	637	1308	1033	1901	1502	2564	2025	3272	2585
9	930	735	1450	1145	2056	1624	2728	2155	3439	2717
10	1059	836	1595	1260	2213	1749	2893	2286	3608	2850
11	1192	942	1744	1378	2373	1875	3061	2418	3778	2985
12	1330	1050	1895	1497	2534	2002	3230	2552	3949	3120
13	1470	1162	2048	1618	2698	2131	3401	2686	4121	3256
14	1614	1275	2204	1741	2864	2262	3572	2822	4293	3391
15	1761	1391	2362	1866	3033	2396	3745	2958	4466	3528
16	1911	1510	2523	1993	3203	2530	3918	3095	4640	3665
17	2064	1631	2686	2122	3375	2666	4091	3232	4813	3803
18	2219	1753	2852	2253	3548	2803	4265	3369	4987	3940
19	2376	1877	3019	2385	3721	2940	4438	3506	5160	4077
20	2535	2003	3188	2519	3895	3077	4612	3644	5334	4214
21	2696	2130	3359	2653	4069	3214	4787	3781	5508	4351
22	2859	2259	3530	2789	4242	3351	4961	3919	5682	4489
23	3024	2389	3702	2925	4416	3488	5135	4056	5855	4626
24	3190	2520	3875	3061	4590	3626	5308	4193	6029	4763
25	3357	2652	4049	3198	4764	3763	5482	4331	6203	4900
26	3526	2785	4222	3336	4938	3901	5657	4469	6377	5038
27	3696	2920	4396	3473	5112	4039	5831	4607	6551	5175
28	3866	3054	4569	3610	5286	4176	6005	4744	6725	5313
29	4038	3190	4743	3747	5460	4314	6179	4882	6899	5450
30	4210	3326	4918	3885	5634	4451	6353	5019	7074	5588

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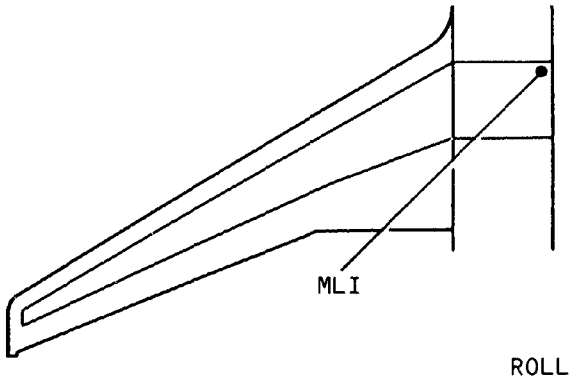
Fuel Quantity Table, MLI - Center Tank
Figure 358



CENTER TANK MLI
PITCH ATTITUDE = 2 DEG. (NOSE UP)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	LEFT WING UP 2		LEFT WING UP 1		LEVEL 0		LEFT WING DOWN 1		LEFT WING DOWN 2	
	L	KG	L	KG	L	KG	L	KG	L	KG
31	4382	3462	5092	4022	5809	4589	6527	5157	7248	5726
32	4555	3599	5266	4160	5983	4726	6702	5294	7422	5863
33	4729	3736	5440	4297	6157	4864	6876	5432	7596	6001
34	4903	3873	5614	4435	6331	5001	7050	5569	7770	6138
35	5076	4010	5788	4573	6505	5139	7224	5707	7944	6276
36	5250	4147	5962	4710	6679	5277	7398	5845	8118	6413
37	5423	4284	6136	4848	6853	5414	7573	5983	8292	6551
38	5597	4422	6310	4985	7027	5552	7747	6120	8466	6688
39	5771	4559	6485	5123	7202	5689	7921	6258	8640	6826
40	5945	4697	6659	5261	7376	5827	8095	6395	8815	6964
41	6119	4834	6834	5399	7550	5964	8269	6533	8989	7101
42	6293	4972	7008	5536	7724	6102	8444	6670	9163	7239
43	6467	5109	7182	5674	7898	6239	8618	6808	9337	7376
44	6641	5247	7356	5811	8072	6377	8792	6945	9511	7514
45	6815	5384	7530	5949	8246	6515	8966	7083	9685	7651
46	6989	5522	7704	6086	8420	6652	9140	7221	9859	7789
47	7163	5659	7878	6224	8595	6790	9315	7359	10033	7926
48	7337	5797	8052	6361	8769	6927	9489	7496	10207	8064
49	7511	5934	8227	6499	8943	7065	9663	7634	10381	8201
50	7685	6072	8401	6637	9117	7202	9837	7771	10556	8339
51	7859	6209	8576	6775	9291	7340	10011	7909	10730	8477
52	8034	6346	8750	6912	9465	7477	10185	8047	10904	8614
53	8208	6484	8924	7050	9639	7615	10359	8184	11078	8752
54	8381	6621	9098	7187	9813	7753	10534	8321	11252	8889
55	8556	6759	9272	7325	9987	7890	10708	8459	11426	9027
56	8730	6897	9446	7462	10162	8028	10882	8597	11600	9164
57	8905	7035	9620	7600	10336	8165	11057	8735	11774	9302
58	9079	7172	9795	7738	10510	8303	11231	8873	11948	9439
59	9253	7310	9969	7876	10684	8440	11405	9010	12122	9577
60	9427	7447	10143	8013	10858	8578	11579	9148	12296	9714

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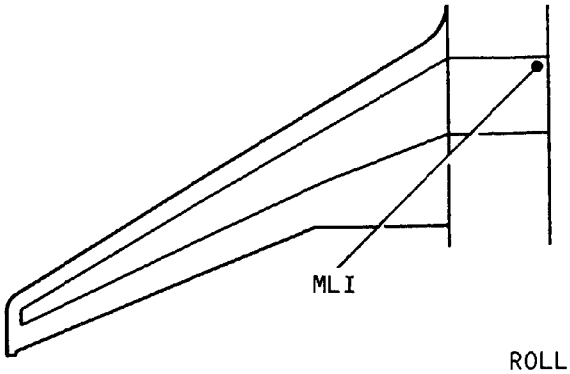
Fuel Quantity Table, MLI - Center Tank
Figure 359



CENTER TANK MLI
PITCH ATTITUDE = 2 DEG. (NOSE UP)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI	LEFT WING UP				LEVEL		LEFT WING DOWN			
	2		1		0		1		2	
READING (INCREMENT)	L	KG	L	KG	L	KG	L	KG	L	KG
61	9601	7584	10317	8151	11032	8715	11753	9285	12471	9852
62	9775	7722	10492	8288	11206	8853	11927	9423	12645	9990
63	9949	7859	10666	8426	11380	8990	12102	9560	12819	10127
64	10123	7997	10840	8563	11555	9128	12275	9698	12993	10265
65	10297	8134	11014	8701	11729	9266	12450	9835	13167	10402
66	10471	8272	11189	8839	11904	9404	12624	9973	13341	10540
67	10646	8410	11363	8977	12078	9542	12799	10111	13515	10677
68	10820	8548	11537	9114	12252	9679	12973	10249	13689	10815
69	10994	8685	11711	9252	12426	9817	13147	10386	13863	10952
70	11168	8822	11885	9389	12600	9954	13321	10524	14036	11088
71	11342	8960	12059	9527	12774	10092	13495	10661	14208	11224
72	11516	9097	12234	9664	12948	10229	13669	10799	14379	11360
73	11690	9235	12407	9802	13123	10367	13843	10936	14550	11494
74	11864	9372	12582	9939	13297	10504	14017	11074	14719	11628
75	12038	9510	12756	10077	13471	10642	14192	11211	14888	11761
76	12212	9647	12931	10215	13645	10780	14366	11349	15055	11893
77	12386	9785	13105	10353	13819	10917	14540	11486	15220	12024
78	12560	9923	13279	10490	13993	11055	14712	11623	15384	12153
79	12735	10061	13453	10628	14167	11192	14884	11758	15546	12281
80	12909	10198	13627	10766	14341	11330	15054	11893	15706	12408
81	13083	10336	13801	10903	14515	11467	15224	12027	15864	12533
82	13257	10473	13975	11041	14690	11605	15391	12159	16019	12655
83	13431	10610	14149	11178	14864	11743	15556	12289	16173	12777
84	13605	10748	14324	11316	15037	11879	15718	12417	16324	12896
85	13778	10885	14498	11453	15209	12015	15878	12543	16472	13013
86	13951	11021	14671	11590	15377	12148	16035	12667	16617	13127
87	14124	11158	14843	11726	15543	12279	16189	12789	16758	13239
88	14296	11294	15014	11861	15705	12407	16341	12909	16897	13349
89	14468	11429	15183	11994	15865	12534	16489	13027	17033	13456
90	14637	11564	15350	12127	16023	12658	16635	13142	17166	13561

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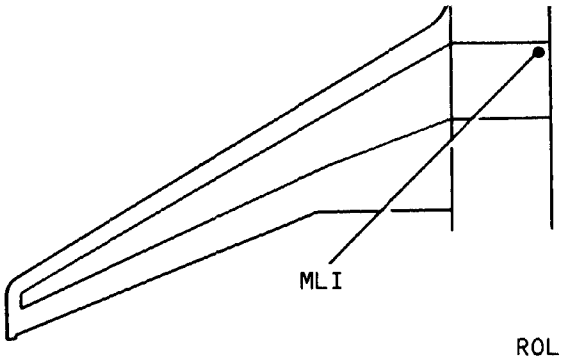
Fuel Quantity Table, MLI - Center Tank
Figure 360



CENTER TANK MLI
PITCH ATTITUDE = 2 DEG. (NOSE UP)
KG VALUE AT SPECIFIC GRAVITY 0.79
L = LITERS

ROLL ATTITUDE (DEGREES)

MLI READING (INCREMENT)	LEFT WING UP 2		LEFT WING UP 1		LEVEL 0		LEFT WING DOWN 1		LEFT WING DOWN 2	
	L	KG	L	KG	L	KG	L	KG	L	KG
91	14806	11697	15516	12258	16178	12781	16778	13254	17295	13663
92	14974	11829	15679	12387	16330	12901	16918	13365	17422	13764
93	15140	11960	15840	12513	16479	13019	17055	13473	17546	13861
94	15304	12090	15997	12638	16625	13134	17188	13579	17667	13957
95	15467	12219	16152	12760	16769	13247	17319	13682	17784	14049
96	15628	12346	16305	12881	16909	13358	17447	13783	17898	14139
97	15787	12472	16454	12999	17046	13467	17572	13882	18009	14227
98	15944	12596	16600	13114	17181	13573	17693	13977	18116	14312
99	16099	12718	16743	13227	17313	13677	17810	14070	18221	14394
100	16250	12838	16884	13339	17442	13779	17925	14161	18322	14475
101	16400	12956	17022	13448	17568	13878	18037	14249	18421	14552
102	16547	13072	17157	13554	17690	13975	18145	14335	18516	14628
103	16691	13186	17289	13658	17809	14069	18250	14418	18608	14701
104	16831	13297	17418	13761	17924	14160	18352	14498	18697	14771
105	16969	13406	17545	13860	18037	14249	18450	14575	18783	14839
106	17105	13513	17668	13958	18146	14335	18545	14651	18866	14904
107	17237	13617	17788	14053	18251	14419	18637	14723	18946	14967
108	17366	13719	17905	14145	18354	14500	18726	14793	19021	15027
109	17493	13819	18019	14235	18454	14579	18811	14861	19093	15084
110	17616	13917	18130	14322	18547	14652	18894	14926	19162	15138

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Fuel Quantity Table, MLI - Center Tank
Figure 361

HYDRAULIC FLUIDS

1. General

The hydraulic fluids instructions define :
- Specification of the hydraulic fluids to be used.
- Special precautions to be observed.

A. Equipment and Materials

ITEM	DESIGNATION
A. Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)
R or	
R Material No. 02-004	Hydraulic Fluids (Ref. 20-31-00)
R or	
R Material No. 02-006	Hydraulic Fluids (Ref. 20-31-00)
B. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
C. Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
D. Material No. 11-006	Cleaning Agents (Ref. 20-31-00)

B. Specifications of Phosphate Ester Base Fluids (Ref. Fig. 001)

The aircraft are delivered to Airlines replenished with hydraulic fluid Material No. 02-003 which complies with Specification A 300B NSA307110.

C. General Requirements

(1)Safety precautions concerning hydraulic fluids

It is forbidden to mix phosphate ester and mineral based hydraulic fluids. When mixed together, these fluids form a jelly in the hydraulic lines, thus endangering the aircraft.

As both types of fluid are used, in the hydraulic systems and the landing gear shock absorbers respectively, safety precautions must be observed to avoid inadvertently mixing them.

Replenish landing gear shock absorbers with Material No. 02-001

Replenish hydraulic systems with Material No. 02-003

(a)Precautions to be observed by personnel

Prior to any servicing of the hydraulic system, personnel should observe and thoroughly understand the following precautions when working with hydraulic fluid.

WARNING : **OBSERVE THE FOLLOWING SAFETY PRECAUTIONS WHEN WORKING ON THE HYDRAULIC SYSTEM. LONG EXPOSURE TO HYDRAULIC FLUID CAN CAUSE SKIN DEHYDRATION AND CHAPPING.**

1 Wash hands thoroughly with soap and water before starting work.

2 Apply barrier cream to hands, wrists, and forearms. Rub cream under fingernails and into creases of skin.

3 Wear goggles when pressure testing components or systems, and whenever there is a possibility of hydraulic fluid splashing into the eyes.

4 If hydraulic fluid splashes into eyes, treat eyes immediately by irrigating thoroughly with clear cold water, and report the incident.

5 Wash hands, wrists, and forearms with soap and hot water whenever they have been in contact with hydraulic fluid.

6 If clothing becomes soaked with hydraulic fluid, remove clothing as

PROPERTY	TEST METHOD(S)		REQUIREMENTS	
	EN Ref.	OTHER	TYPE IV	TYPE V
COLOUR CONDITION	NSA307110		PURPLE CLEAR APPEARENCE	
UTILIZATION TEMPERATURE			-40°C AND 110°C / -40°F AND 230° F	
DENSITY AT 23±3°C ($kg.m^{-3}$)	ISO 3675	ASTM D 1298	990 TO 1066	970 TO 1020
ABSOLUTE KINEMATIC VICOSITY CS, AT +38°C/+100°F (CENTISTOKE)	ISO 3104	ASTM 445	9.00 - 12.50	
POUR POINT TEMPERATURE	ISO 3016	ASTM D 97	< -62°C (-80°F)	
AUTO-IGNITION TEMPERATURE	NSA307110		>400°C (752°F)	
FLASH POINT TEMPERATURE	ISO 2592	ASTM D 92	⩾160°C (320°F)	
WATER CONTENT (% MASS H_2O)	ISO 12937	ASTM D 6304	⩽0.20	
ACIDITY INDEX (KOH/g)	ISO 6618	ASTM D 974	⩽0.15	⩽0.10
SOLID PARTICLE POLLUTION (COUNTING °)	NF L 41-102	ARP /AS 598	⩽7	
GRAVIMETRIC ANALYSIS (mg)	NF L 41-102	ARP 785	NOT SPECIFIED	⩽1
FILTERABILITY INDEX ("FI")	NSA307110		1.00 - 1.60	
ELECTRICAL CONDUCTIVITY (MICROSIEMENS/CM)	NSA307110		⩾0.30	
CHLORINE CONTENT (parts per million)	NSA307110		⩽50	⩽30

PARTICLE SIZE RANGE MICRONS (INCHES)	MAXIMUM CONTAMINATION LIMITS NUMBER OF PARTICLES (BASED ON A 100ML 0.026 US GAL SAMPLE)	
	CLASS 7 (NEW FLUID)	CLASS 9 (IN SERVICE)
5 TO 15µ(0.0002 TO 0.0006in.)	32000	128000
15 TO 25µ(0.0006 TO 0.001in.)	5700	22800
25 TO 50µ(0.001 TO 0.002in.)	1012	4050
50 TO 100µ(0.002 TO 0.004in.)	180	720
OVER 100µ(0.004in.) AND FIBERS	32	128

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Fluid Characteristics
Figure 001

R

soon as possible, thoroughly wash skin, and put on clean clothing.

(b)Technical precautions

CAUTION : OBSERVE THE FOLLOWING TECHNICAL PRECAUTIONS WHEN WORKING ON THE HYDRAULIC SYSTEM. HYDRAULIC FLUID WILL ATTACK A WIDE RANGE OF MATERIALS INCLUDING RUBBER, COPPER, VARIOUS PLASTICS, AND PAINTS. ANY CLEANING OPERATION USING SOLVENTS MUST BE PERFORMED WELL VENTILATED AREA. OBSERVE NORMAL SAFETY PRECAUTIONS.

1 Make certain that hydraulic fluid does not come into contact with aircraft outside of hydraulic system. Keep spillage to an absolute mini mum. Clean up spilled hydraulic fluid immediately to prevent entry into adjacent areas and to prevent future false hydraulic leak reports. If spillage occurs, wipe up the fluid with a dry cloth, and wash contaminated area with Material No. 11-003 or Material NO.11-006

2 When washing metal parts before assembly, use only Material No.11-003 and ensure that all traces of the solvent are removed before assembly.

3 Use only Material No. 02-003 when filling tanks, filter bowls, pump pumps, etc., before installation of components.

4 If a system becomes contaminated with any petroleum based oil or solvent drain the system and flush with clean hydraulic fluid.

5 Prior to connecting hydraulic power or replenishing carts to the aircraft make certain that cart fluid specification meets aircraft requirements (Ref. Fig. 001).

CAUTION : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT THE HYDRAULIC FLUID TO BE USED FOR REPLENISHING HAS THE REQUIRED LEVEL OF PURITY.

NOTE : The replenishing or topping up procedures described in this topic apply to the Green, Blue and Yellow reservoirs.

1. Hydraulic System Fluid Capacities

	SYSTEM/COMPONENT	QUANTITY LITERS	QUANTITY US GAL	SPECIFICATION
	GREEN SYSTEM			
	Reservoir			
	Total capacity	40	10.57	Material
	Max. gaugeable	30	7.93	No.02-003
	Normal fill level	17	4.49	(Ref.
	Low level (warning level)	5	1.32	20-31-00)
R	Green system	170 approx.	44.80	
R	Total capacity			
	BLUE SYSTEM			
	Reservoir			
	Total capacity	22	5.81	
	Max. gaugeable	17	4.49	
	Normal fill level	12	3.17	
	Low level (warning level)	5	1.32	
R	Blue system	85 approx.	21.14	
R	Total capacity			
	YELLOW SYSTEM			
	Reservoir			
	Total capacity	28 +3 reserve	7.40+0.79	
	Max. gaugeable	24	6.34	

	SYSTEM/COMPONENT	QUANTITY		SPECIFICATION
		LITERS	US GAL	
	Normal fill level	18.5	4.89	
	Low level (warning level)	5	1.32	
R	Yellow system	120 approx.	31.60	
R	Total capacity			

2. Hydraulic Reservoir Fluid Level Check

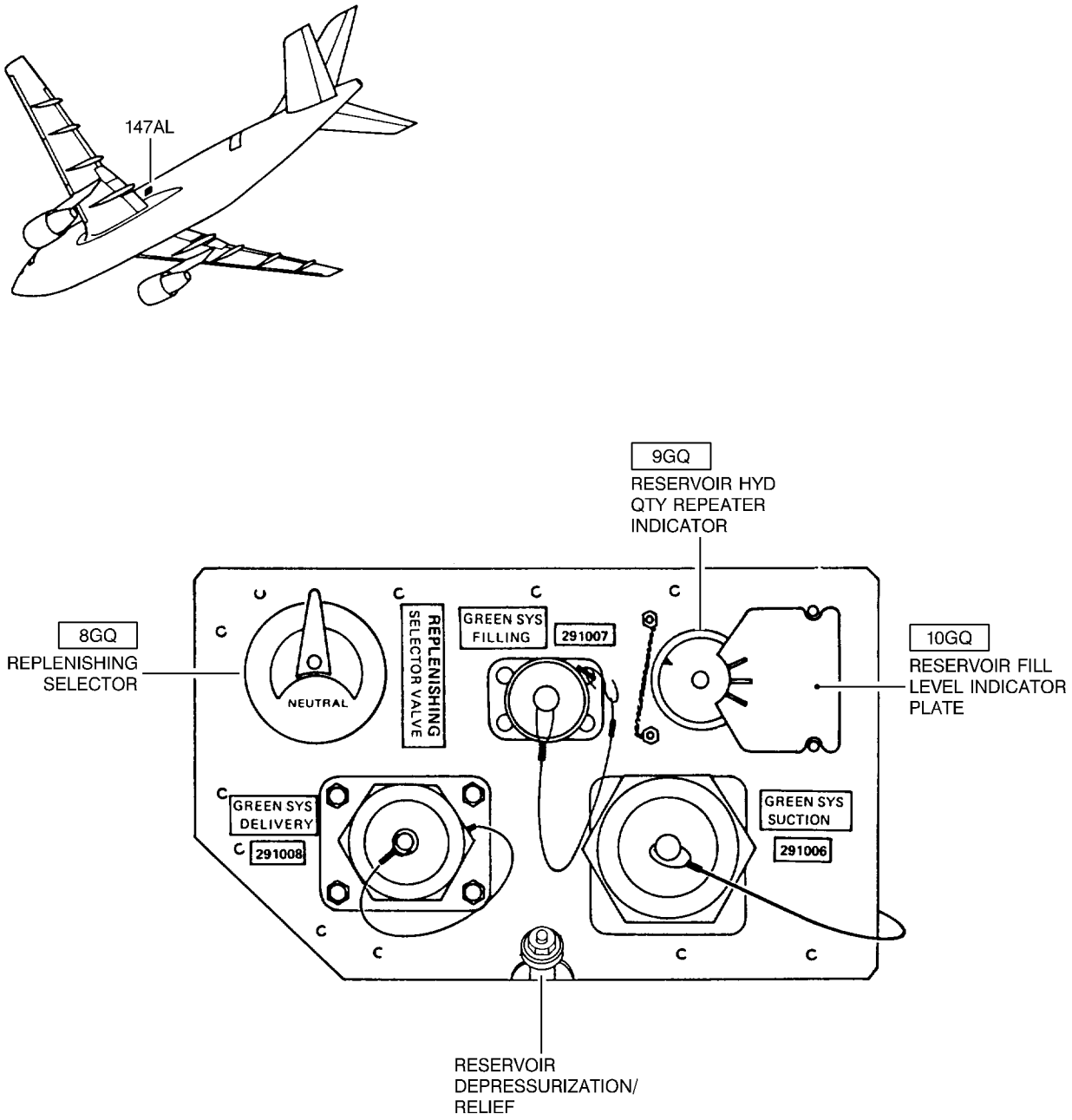
A. Reason for the Job
(1)Reservoir fluid level check.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Acccess Platform 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-24-00, P. Block 301	Yellow Auxiliary Power Electrical Pump
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure
(Ref. Fig. 001)
(Ref. Fig. 002)
(1)Job set-up
(a)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)In flight compartment, select following aircraft configuration :
1 Speedbrakes and spoilers retracted.
2 Landing gear extended and doors closed.
3 Forward and aft cargo compartment doors 811 and 812 closed.

4 On HYD PWR panel 427VU, ELEC PUMPS pushbutton switch released (out). LO PR and ON legends off.
5 On panel 427VU, PTU pushbutton switches released (out). ON legends off.
(c)Open left landing gear main door (Ref. 32-12-11, P. Block 301).
(d)Position access platform.
(e)Display warning notices prohibiting operation of the hydraulic systems, as this would result in a change in the basic aircraft configuration and consequently a change in the level of fluid in the reservoir to be replenished.
(f)Depressurize hydraulic system concerned (Ref. 29-10-00, P. Block 301). Do not depressurize hydraulic system reservoirs.
NOTE : In Yellow hydraulic system do not depressurize Braking system accumulators as normal Yellow reservoir servicing procedure must be performed with Brake accumulators hydraulically pressurized. Make certain that pressure in Brake accumulators is approximately 3.000 psi (206 bars).
NOTE : However, when Brake accumulators are hydraulically depressurized it is possible to perform servicing as follows.
- either add 3.5 liters to normal level i.e 18.5 liters in order to take into account Brake accumulators capacity
- or hydraulically repressurize Brake accumulators



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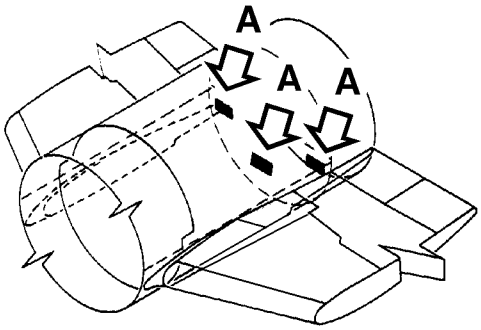
Hydraulic Reservoir Fluid Level Check
Figure 001



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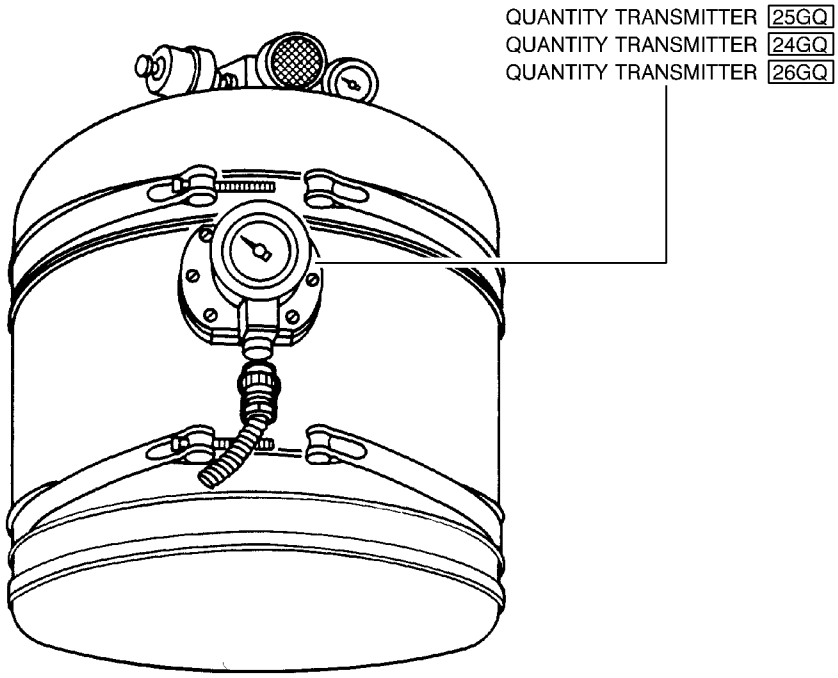

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Quantity Transmitter Location
Figure 002

(Ref. 29-24-00, P. Block 301) and perform normal servicing procedure.

(g) Make certain that hydraulic system accumulator associated to the reservoir to be checked is empty of fluid i.e that nitrogen pressure is 1450 psi (100 bars).

NOTE : If according to above note, Yellow hydraulic reservoir servicing is made with brake accumulators hydraulically depressurized, check that nitrogen pressure is 1450 psi (100 bars).

(h) Make certain that pressure read on indicator associated to the reservoir to be checked is between 1.8 bars (26 psi) and 3.5 bars (50 psi). If required, pressurize relevant reservoir (Ref. 29-14-00, P. Block 301).

(2) Fluid level check :

(a) Open access door 147AL, place the reservoir filling manual selector 8GQ in the position corresponding to the reservoir being checked.

(b) On the reservoir fill level indicator plate 10GQ, check that the light of color corresponding to the reservoir selected comes on.

(c) If aircraft is in nominal configuration, check the fluid level with the table below :

1 Speedbrakes and spoilers retracted.

2 Landing gear extended and doors closed.

3 Forward and aft cargo compartment doors 811 and 812 closed.

NOTE : If the temperature is not approximately 20°C (68°F), use quantity transmitters 24GQ, 25GQ or 26GQ.

NOTE : When Brake accumulators are hydraulically depressurized, the reservoir fluid level should be checked on the Yellow reservoir quantity transmitter 26GQ and not on the hydraulic repeater indicator 9GQ.

NOTE : - With all cargo doors open, lower the nominal reservoir fluid level by 1 liter (0,2641 US. Gal).
- With only upper deck cargo door fully open (FWD and AFT cargo doors closed), lower the nominal reservoir fluid level by 0.5 liter (0,1320 US. Gal).
- With only FWD and AFT cargo doors open (upper deck cargo door closed), lower the nominal reservoir fluid level by 0.5 liter (0,1320 US. Gal).

Temperature (°C)	Temperature (°F)	Green level (liters)	Green level (US Gal.)	Blue level (liters)	Blue level (US Gal.)	Yellow level (liters)	Yellow level (US Gal.)
-40	-40	8.8	2.3	7.6	2.0	12.2	3.2
-30	-22	10.2	2.7	8.4	2.2	13.3	3.5
-20	-4	11.5	3.0	9.2	2.4	14.5	3.8
-10	14	13	3.4	10	2.6	15.5	4.1
0	32	14.2	3.73	10.6	2.8	16.5	4.3
10	50	15.6	4.1	11.4	3.0	17.5	4.6

Temperature (°C)	Temperature (°F)	Green level (liters)	Green level (US Gal.)	Blue level (liters)	Blue level (US Gal.)	Yellow level (liters)	Yellow level (US Gal.)
20	68	17	4.5	12.2	3.2	18.5	4.9
30	86	18.3	4.8	13	3.4	20	5.2
40	104	19.7	5.2	13.7	3.6	20.5	5.4
50	122	21.1	5.6	14.5	3.8	21.7	5.7

(d)Place the reservoir filling manual selector 8GQ in neutral position.

(3)Close-up
(a)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(b)Close access door 147AL.
(c)Remove access platform.
(d)Close left landing gear main door (Ref. 32-12-11, P. Block 301).
(e)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

3. Hydraulic Reservoir Replenishing

A. Reason for the Job
(1)Hydraulic reservoir filling or topping up.

B. Equipment and Materials

ITEM	DESIGNATION
(1)97A29102035000 or equivalent	Connector-Pressurizing, Hydraulic Tank
(2)99A29001006000 or equivalent	Unit-Topping Up Hydraulic Tank (Hand Operated)
(3)	Access Platform, 2.6 m (8 ft. 8 in.)
(4)	Fluid Recovery Containers
(5)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-00-00, P. Block 401	General Removal/Installation
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-24-00, P. Block 301	Yellow Auxiliary Power Electric Pump
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure
(Ref. Fig. 004)
(1)Job set-up
(a)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)In flight compartment, select following aircraft configuration :
1 Speedbrakes and spoilers retracted.
2 Landing gear extended and doors closed.
3 Forward and aft cargo compartment doors 811 and 812 closed.
4 On HYD PWR panel 427VU, ELEC PUMPS pushbutton switch released (out). LO PR and ON legends off.
5 On panel 427VU, PTU pushbutton switches released (out). ON legends off.
(c)Open left landing gear main door (Ref. 32-12-11, P. Block 301).
(d)Position access platform.
(e)Display warning notices prohibiting operation of the hydraulic systems as this would result in a change in the basic aircraft configuration and consequently a change in the level of fluid in the reservoir to be replenished.
(f)Depressurize hydraulic system concerned (Ref. 29-10-00, P. Block 301). Do not depressurize hydraulic system reservoirs.
NOTE : In Yellow hydraulic system do not depressurize Braking system accumulators as normal Yellow reservoir servicing procedure must be performed with Brake accumulators hydraulically pressurized. Make certain that pressure in Brake accumulators is approximately 3.000 psi (206 bars).

NOTE : However, when Brake accumulators are hydraulically depressurized it is possible to perform servicing as follows.
- either add 3.5 liters to normal level i.e 18.5 liters in order to take into account Brake accumulators capacity
- or hydraulically repressurize Brake accumulators (Ref. 29-24-00, P. Block 301) and perform normal servicing procedure.

(g)Make certain that hydraulic system accumulator associated to the reservoir to be checked is empty of fluid i.e that nitrogen pressure is 1450 psi (100 bars).

NOTE : If according to above note Yellow hydraulic reservoir servicing is made with brake accumulators hydraulically depressurized check that nitrogen pressure is 1450 psi (100 bars).

(h)Make certain that pressure read on indicator associated to the reservoir to be checked is between 1.8 bars (26 psi) and 3.5 bars (50 psi). If required, pressurize relevant reservoir (Ref. 29-14-00, P. Block 301).

(2)Filling/topping up

Perform related bleeding procedure to make certain that hydraulic fluid quantity is correct (Ref. 29-00-00, P. Block 401) :

NOTE : - if a large number of components is replaced,
- if there is a hydraulic fluid low level which causes loss of the system,
- if there is a large loss of hydraulic fluid.

(a)Filling of reservoir using hydraulic tank (reservoir) replenishing unit.

NOTE : Make certain that filling pressure does not exceed 11 bars (160 psi).

1 In zone 147, on Green system ground connector, place reservoir filling manual selector 8GQ in position corresponding to reservoir to be filled.

2 On reservoir fill level indicator plate 10GQ, check that light of color corresponding to reservoir selected comes on.

3 Make certain that aircraft is in nominal configuration :
- Speedbrakes and spoilers retracted.
- Landing gear extended and doors closed.
- Forward and aft cargo compartment doors 811 and 812 closed.

NOTE : When Brake accumulators are hydraulically depressurized, the reservoir fluid level should be checked on the Yellow reservoir quantity transmitter 26GQ and not on the hydraulic repeater indicator 9GQ.

4 Start up hydraulic tank replenishing unit.

NOTE : If the temperature is not approximately 20°C (68°F), use quantity transmitters 24GQ, 25GQ or 26GQ and table below.

Temperature (°C)	Temperature (°F)	Green level (liters)	Green level (US Gal.)	Blue level (liters)	Blue level (US Gal.)	Yellow level (liters)	Yellow level (US Gal.)
-40	-40	8.8	2.3	7.6	2.0	12.2	3.2
-30	-22	10.2	2.7	8.4	2.2	13.3	3.5

Temperature (°C)	Temperature (°F)	Green level (liters)	Green level (US Gal.)	Blue level (liters)	Blue level (US Gal.)	Yellow level (liters)	Yellow level (US Gal.)
-20	-4	11.5	3	9.2	2.4	14.5	3.8
-10	14	13	3.4	10	2.6	15.5	4.1
0	32	14.2	3.73	10.6	2.8	16.5	4.3
10	50	15.6	4.1	11.4	3.0	17.5	4.6
20	68	17	4.5	12.2	3.2	18.5	4.9
30	86	18.3	4.8	13	3.4	20	5.2
40	104	19.7	5.2	13.7	3.6	20.5	5.4
50	122	21.1	5.6	14.5	3.8	21.7	5.7

NOTE : If forward and aft cargo compartment doors are open, remove 0.25 liter (0.065 US Gal.) per door from the Yellow indication on the above chart, to take into account the difference of fluid contained in cargo actuator extension chambers.

NOTE : Hydraulic tank replenishing unit pressure must not exceed 11.03 bars (160 psi). For a pressure of 7.6 to 11.03 bars (110 to 160 psi), flow rate is 3.5 l/mn (0.92 US gal/mn).

5 Place the reservoir filling manual selector 8GQ in neutral (NEUTRE) position.

(b)Topping up of reservoir using the reservoir filling hand-pump. (Ref. Fig. 003)

1 At FR54, in zone 147, under flaps torque limiter remove hand-pump handle from stowage position :

NOTE : The filling tube is housed in the hand-pump handle to save space.

2 Remove locking pin and withdraw filling tube from hand-pump handle.

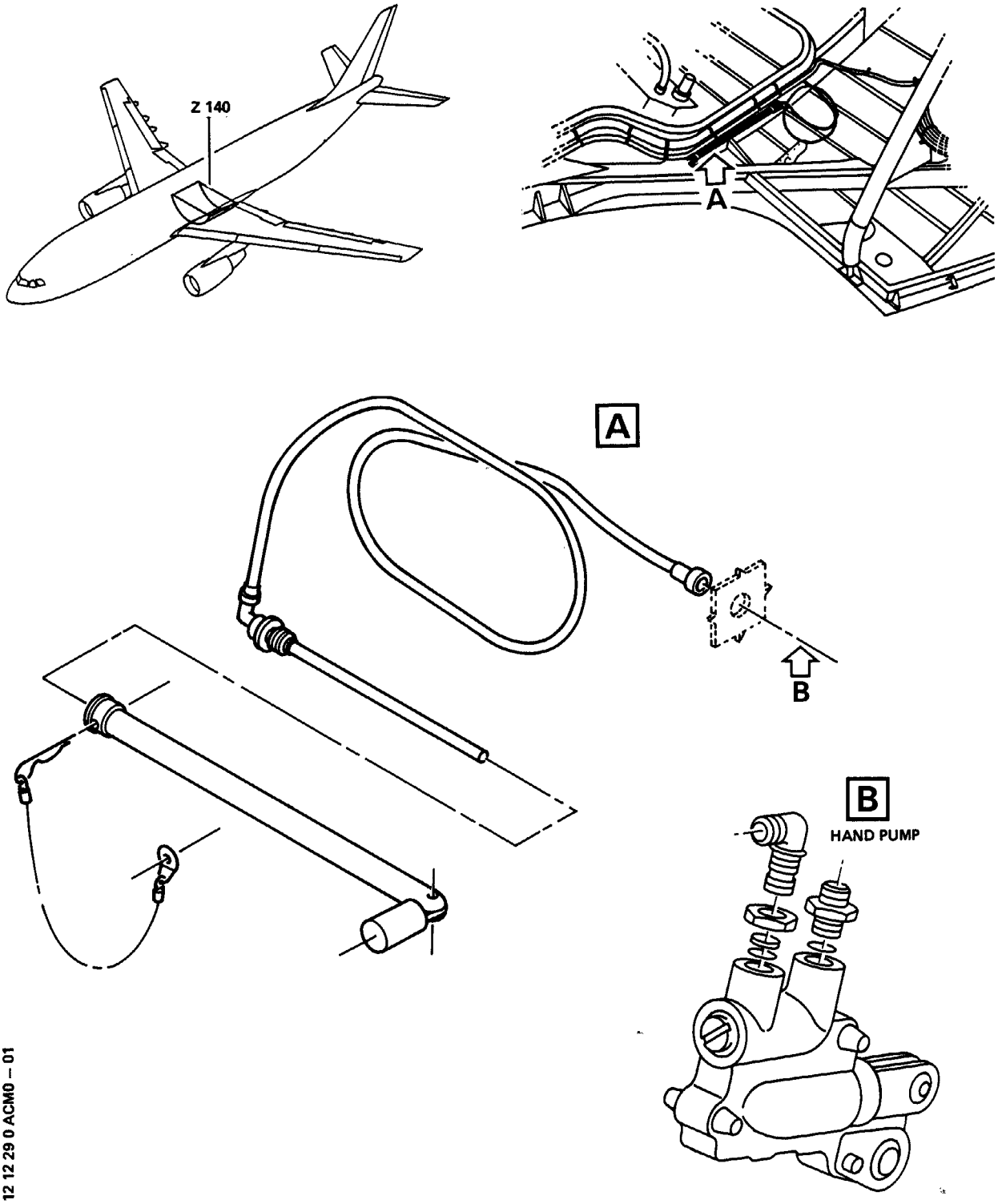
3 Place filling tube in hydraulic fluid reserve.

4 Connect hand-pump handle to pump splined shaft. Access is gained through Green hydraulic ground connector (access door 147AL).

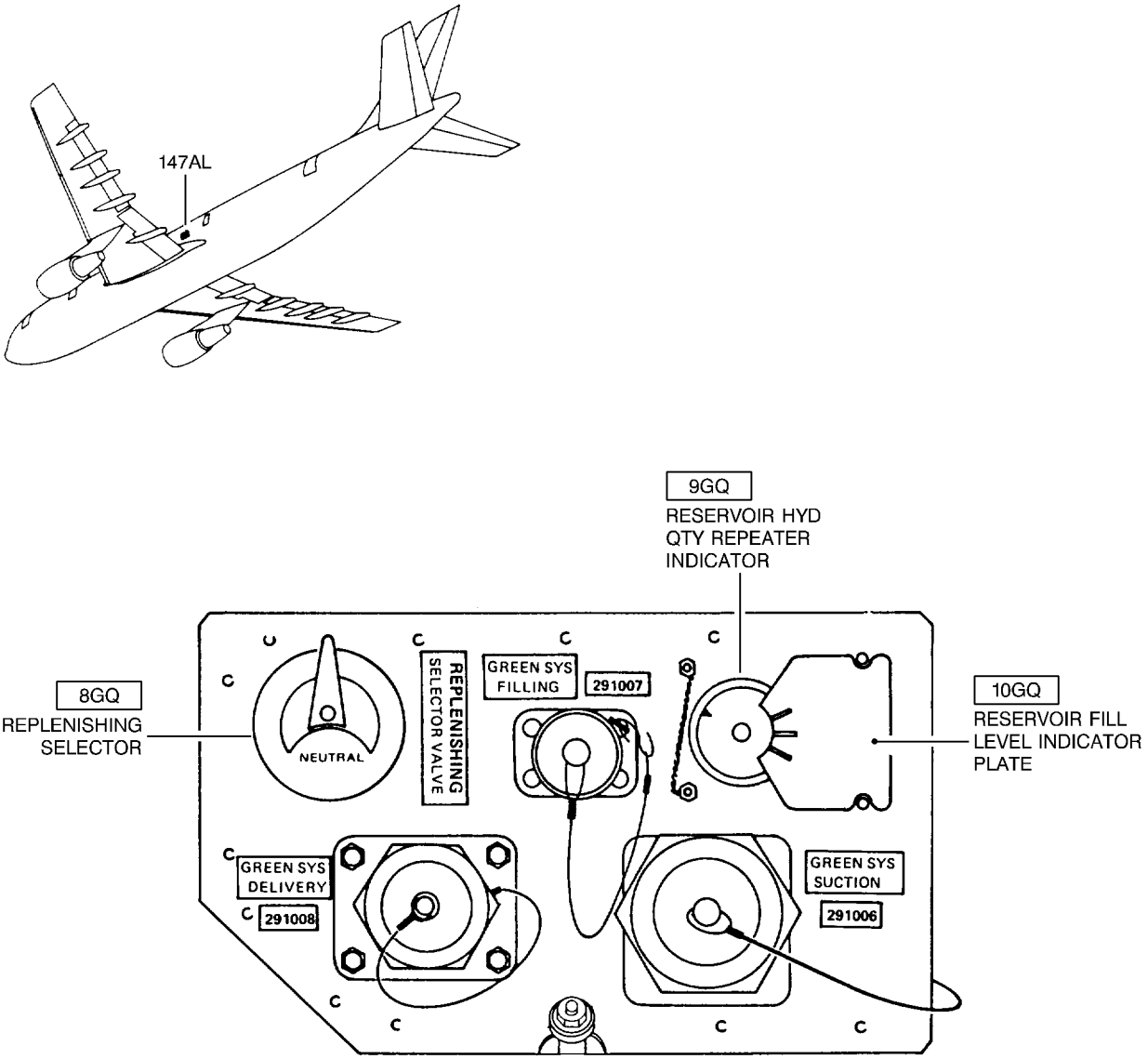
5 On Green hydraulic system ground connector, place filling selector 8GQ in position corresponding to reservoir to be topped-up.

6 On fill level indicator plate 10GQ, check that light of color corresponding to reservoir selected comes on.

7 Depending on ambient temperature, adjust fluid level according to the table below. If the ground temperature is between two values in the table, the operator must choose the nearest indicated value.



Reservoir Filling Hand-Pump
Figure 003



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Hydraulic Reservoir Replenishing
Figure 004

Temperature (°C)	Temperature (°F)	Green level (liters)	Green level (US Gal.)	Blue level (liters)	Blue level (US Gal.)	Yellow level (liters)	Yellow level (US Gal.)
-40	-40	8.8	2.3	7.6	2.0	12.2	3.2
-30	-22	10.2	2.7	8.4	2.2	13.3	3.5
-20	-4	11.5	3	9.2	2.4	14.5	3.8
-10	14	13	3.4	10	2.6	15.5	4.1
0	32	14.2	3.73	10.6	2.8	16.5	4.3
10	50	15.6	4.1	11.4	3.0	17.5	4.6
20	68	17	4.5	12.2	3.2	18.5	4.9
30	86	18.3	4.8	13	3.4	20	5.2
40	104	19.7	5.2	13.7	3.6	20.5	5.4
50	122	21.1	5.6	14.5	3.8	21.7	5.7

8 Operate pump and observe rise in fluid level on quantity repeater 9GQ.

9 Stop flow of hydraulic fluid when pointer of quantity repeater indicator 9GQ is at end of the coloured line (that agrees with the applicable system).

NOTE : If forward and aft cargo compartment doors are open, fill Yellow hydraulic reservoir to 18 liters to take into account the difference of fluid contained in cargo actuator extension chambers.

NOTE : If quantity repeater 9GQ does not indicate full and an overflow occurs, the tank is overfull and cannot be properly pressurized.

NOTE : When Brake accumulators are hydraulically depressurized, reservoir fluid level should be checked on Yellow reservoir quantity transmitter and not on hydraulic quantity repeater indicator 9GQ.

10 Place filling selector 8GQ in neutral (NEUTRE) position.

11 Remove hand-pump handle from pump.

12 Insert filling tube in hand-pump handle. Install locking pin.

13 Place hand-pump handle in stowage position.

NOTE : If the reservoir has been drained prior to replenishment, it must be pressurized, and a leakage check must be performed, both for the overall assembly and, more especially, for the drain valve plugs.

(3)Close-up

(a)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, p. Block 301).

(b)Disconnect and remove hydraulic tank replenishing unit and hydraulic fluid reserve.
(c)Close access door 147AL.
(d)Remove access platform.
(e)Close left main gear main door (Ref. 32-12-11, P. Block 301).
(f)Remove warning notices and access equipment.

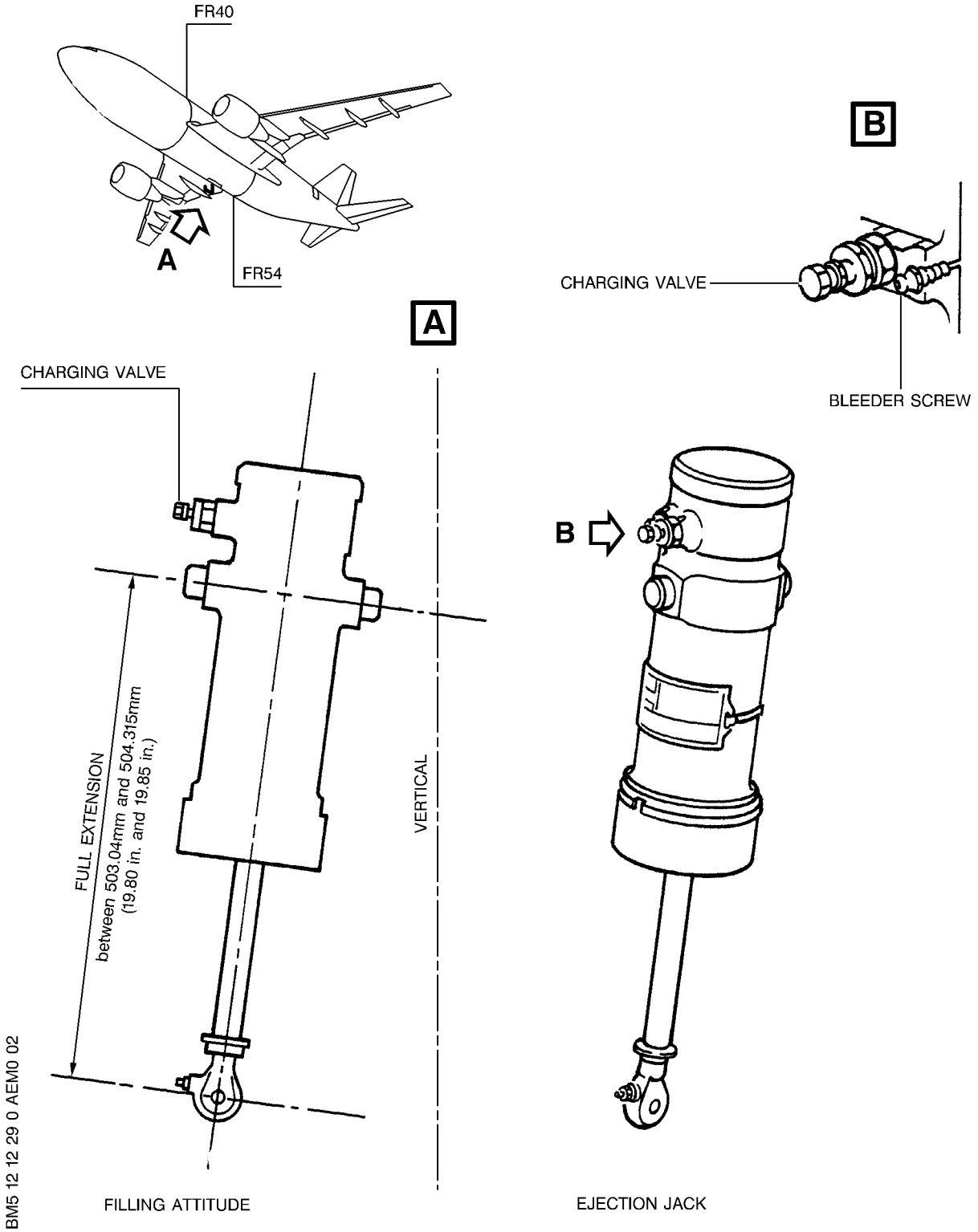
4. Ram Air Turbine (RAT) Extension Jack

A. Reason for the Job
(1)Filling or topping-up after inspection or removal.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A29003001000	Graduated Syringe 0.5 l (0.132 US gallon)
(2)	Access Platform 2.6 m (8 ft. 8 in.)
(3)	Squeeze Bottle
(4)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedure - 29-25-00, P. Block 301 - CMM 29-21-23	Yellow Auxiliary Power (Ram Air Turbine)

(Ref. Fig. 005)
(1)Job set-up
(a)Position safety barriers and display warning notices around RAT extension area.
(b)Position access platform.
(c)Install protective equipment on RAT.
(d)In flight compartment, select RAT in extended position (Ref. 29-25-00, P. Block 301).
(e)Display warning notice prohibiting connection of RAT check-out unit to receptacle 142VC in zone 144.
(2)Filling
(a)Make sure that RAT is in fully extended position.
(b)Remove protective cap from charging valve.
(c)Loosen charging valve nut.
(d)Check that flexible hose of syringe 98A29003001000 is filled with hydraulic fluid.
(e)Take a reference on syringe graduation.
(f)Connect flexible hose to charging valve.
(g)Loosen bleeder screw.
(h)Perform measurement by filling jack until hydraulic fluid begins to run from bleeder screw.
(j)If added fluid volume is greater than 17 cl (0.045 US Gallon), remove jack and perform leakage test (Ref. CMM 29-21-23, refer to Testing and Trouble Shooting, para. 4.D.).
(k)Disconnect flexible hose from charging valve.
(l)Install a squeeze bottle or similar to charging valve.
(m)Apply slight air pressure (< 5 psi) to charging valve (this helps any trapped excess fluid to drain from bleeder).
(n)Continue until fluid stops draining from bleeder.
(p)TORQUE charging valve nut to between 0.25 and 0.35 m.daN (20 and 30 lbf.in.).
(q)TORQUE bleeder screw to between 0.25 and 0.35 m.daN (20 and 30 lbf.in.)
(r)Disconnect flexible hose.



Hydraulic RAT Ejection Jack Replenishing
Figure 005

(s)Install protective cap on charging valve.
(t)Clean residual fluid from exterior of jack.
(u)Safety bleeder screw with lockwire.

(3)Close-Up
(a)Clean RAT. Wipe off all traces of hydraulic fluid.
(b)Retract RAT (Ref. 29-25-00, P. Block 301).
(c)Remove topping-up unit.
(d)Remove access platform.

LANDING GEAR REPLENISHING

1. Hydraulic Fluid Safety Precautions

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Barrier cream
(2)	Goggles
(3)Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)
or	
Material No. 02-004	Hydraulic Fluids (Ref. 20-31-00)
or	
Material No. 02-006	Hydraulic Fluids (Ref. 20-31-00)
(4)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
(5)Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
or	
Material No. 11-006	Cleaning Agents (Ref. 20-31-00)

B. Precautions to be Observed by Personnel

Prior to any servicing of the hydraulic system, personnel should observe and thoroughly understand the following precautions when working with hydraulic fluid.

WARNING : OBSERVE THE FOLLOWING SAFETY PRECAUTIONS WHEN WORKING ON THE HYDRAULIC SYSTEM. LONG EXPOSURE TO HYDRAULIC FLUID CAN CAUSE SKIN DEHYDRATION AND CHAPPING.

(1)Wash hands thoroughly with soap and water before starting work.
(2)Apply barrier cream to hands, wrists, amd forearms. Rub cream under fingernails and into creases of skin.
(3)Wear goggles when pressure testing components or systems, and whenever there is a possibility of hydraulic fluid splashing into the eyes.
(4)If hydraulic fluid splashes into eyes, treat eyes immediately by irrigating thoroughly with clear cold water, and report the incident.
(5)Wash hands, wrists, and forearms with soap and hot water whenever they have been in contact with hydraulic fluid.
(6)If clothing becomes soaked with hydraulic fluid, remove clothing as soon as possible, thoroughly wash skin, and put on clean clothing.

C. Technical Precautions

Prior to any servicing of the hydraulic system, personnel should observe and thoroughly understand the following precautions. Careful adherence to the instructions will aid in maintaining a functional and trouble-free system.

CAUTION : OBSERVE THE FOLLOWING TECHNICAL PRECAUTIONS WHEN WORKING ON THE HYDRAULIC SYSTEM. HYDRAULIC FLUID WILL ATTACK A WIDE RANGE OF MATERIALS INCLUDING RUBBER, COPPER, VARIOUS PLASTICS, AND PAINTS.

CAUTION : THE HYDRAULIC SYSTEMS SHALL BE REPLENISHED WITH MATERIAL No.02-003 (REF.20-31-00).
SHOCK ABSORBERS SHALL BE REPLENISHED WITH HYDRAULIC FLUID MATERIAL No. 02-001 OR No. 02-004 OR No. 02-006 (REF.20-31-00).

(1)Make certain that hydraulic fluid does not come into contact with aircraft outside of hydraulic system. Keep spillage to an absolue minimum. clean up spilled hydraulic fluid immediately to prevent future false hydraulic leak reports. If spillage occurs, wipe up the fluid with a dry cloth, and wash contamined area with Material No.11-003 or 11-006 (Ref.20-31-00).

WARNING : CLEANING OPERATIONS USING SOLVENTS SHOULD BE PERFORMED IN A WELL VENTILATED ATMOSPHERE. EXERCISE NORMAL SAFETY PRECAUTIONS DURING USE.

(2)When washing metal parts before assembly, use only solvent (Material No. 11-003), and mesure that all traces of the solvent are removed before assembly.

(3)Use only approved hydraulic fluid when filling tanks, filter bowls, pumps, etc., before installation of components.

CAUTION : USE ONLY APPROVED HYDRAULIC FLUID (MATERIAL No.02-003 REF.20-31-00). UNAPPROVED HYDRAULIC FLUIDS CAN CAUSE DAMAGE TO AIRCRAFT SYSTEMS.

(4)Use only approved hydraulic fluid for flushing or testing hydraulic components.

(5)Take care to prevent contamination of hydraulic fluid with other unapproved fluids, fuel, oils, water, or dirt.

(6)If a system becomes contaminated with any petroleum-based oil or solvent, drain the system and flush with clean hydraulic fluid.

(7)Prior to connecting hydraulic power or replenishing carts to the aircraft make certain that cart fluid specification meets aircraft requirements.

2. Low Pressure Brake System Bleeding and Replenishing

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

A. Reason for the Job

(1)Low pressure brake system bleeding and replenishing

B. Equipment and Material

ITEM	DESIGNATION
(1)98A29001001000	Unit Filling, Aircraft Brake System
or	
98D29003502000	Filling Tool - Braking System
(2)	Electric Ground Power Unit, 3-Phase, 115/200 V, 400 Hz, 90 KVA
(3)	Wheel Chocks
(4)	Safety Barriers
(5)	Access Platform (2.60 m - 4.70 m) (8 ft. 7 in. - 15 ft. 5 in.
(6)	Warning Notice
(7)	Vinyl Tubing
(8)	Hydraulic Fluid Container
(9)	2 Hydraulic Pressure Gages (0-200 bars, 0-2900 psi)
10)	Lockwire
11)	2 Filling valves
12)Material No. 02-003 (de-aerated)	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Tank Replenishing
- 24-41-00, P. Block 301	External Power
- 29-00-00, P. Block 601	General Inspection/Check
- 29-10-00, P. Block 301	Main Hydraulic Power
- 29-14-00, P. Block 301	Tank Pressurization/Depressurization
- 32-12-11, P. Block 301	Main Gear Main Door/Ground Door(s) Opening
- 32-43-00, P. Block 501	Standby Braking

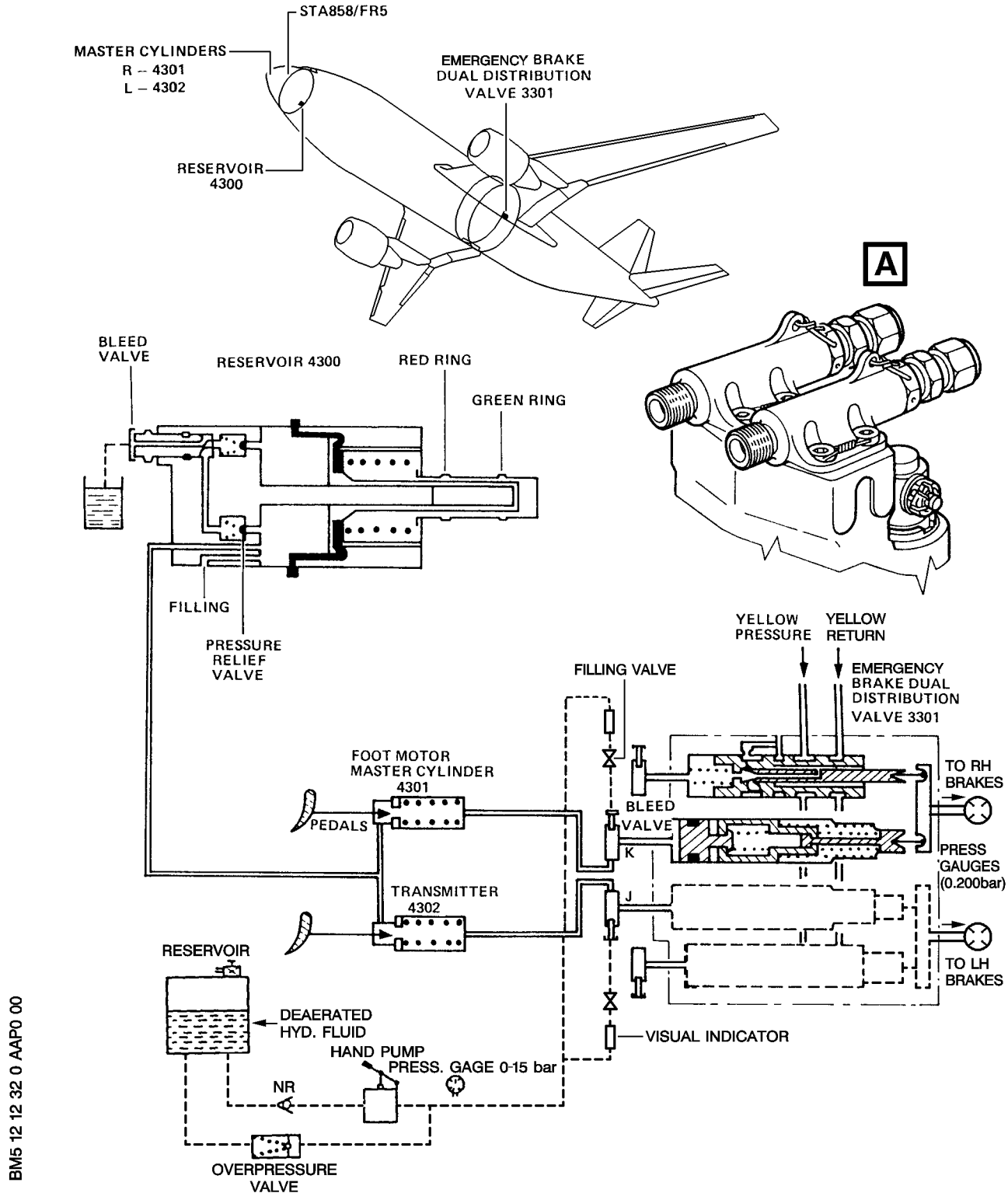
C. Procedure (Ref. Fig. 001, 002)

(1)Job set-up

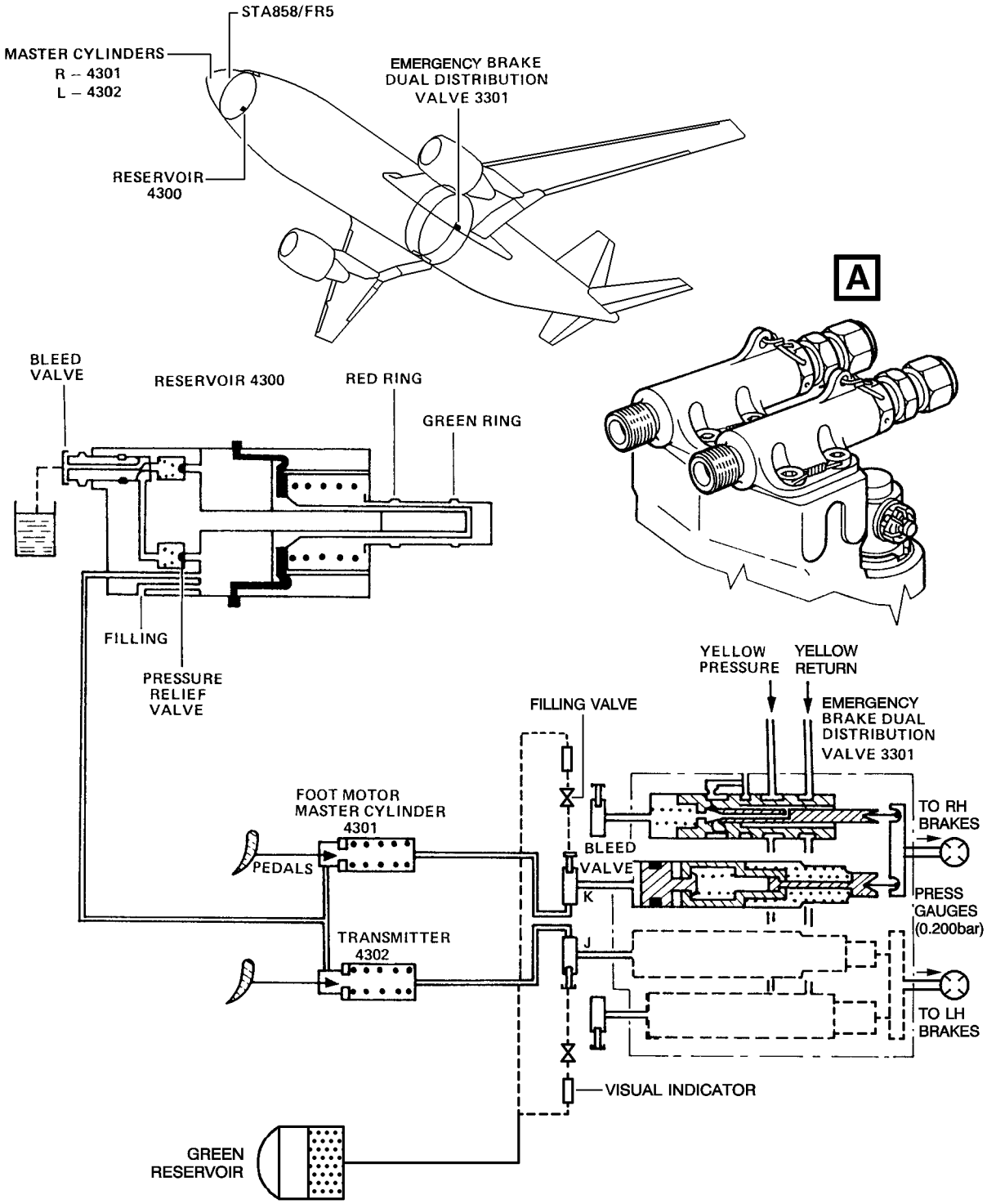
(a)Make certain that wheel chocks are in position.

R (b)Connect electrical ground power unit (Ref. 24-41-00, P. Block 301).
R (c)On panel 4VU :
- make certain that landing gear Normal control lever is in DOWN position and prohibit its operation by displaying a warning notice.
R (d)Between the First Officer's and Flight Engineer's seats :
- make certain that the landing gear Free Fall extension control handle is in Normal position.
R (e)On panel 9VU :
- make certain that the PARKING BRAKE control handle is in Normal (released) position.
R (f)Position access platform.
R (g)Open access doors 132AZ and 811.
R (h)Position safety barriers prohibiting access to door travel ranges.
WARNING : MAKE CERTAIN THAT DOOR TRAVEL RANGES ARE CLEAR.
R (j)Open LH main gear door (Ref. 32-12-11, P. Block 301).
WARNING : WHEN DOORS ARE OPEN, MAKE CERTAIN THAT SAFETY COLLARS ARE POSITIONED ON DOOR ACTUATING CYLINDERS.
(k)Remove the Emergency brake distribution dual valve 3301 bleeder protective caps.
(l)Open the bleeder of reservoir 4300 located under the floor at frame 0. Connect a vinyl tubing to collect the hydraulic fluid and observe the presence of bubbles during the fillings.
NOTE : For bleeding and replenishing of low pressure brake system, use only de-aerated hydraulic fluid Material No. 02-003.
(m)Under the floor between frames 51 and 52 on the dual valve block remove the plugs and open the bleeders installed on adapters J and K. Install a filler valve on each bleeder (J LH master cylinder, K RH master cylinder).
(n)Connect the filling tube 98A29001001000 to the valves installed on the bleeders (Ref. Fig. 001) or connect the filling tube 98D29003502000 on the green reservoir drain valve to the valves installed on the bleeders (Ref. Fig. 002).
NOTE : All the bench pipes must be carefully filled, making sure there is no air inside.
(p)Install the pressure gauges at the bleeding points of each wheel brake unit.

(2)Bleeding
(a)Drop the pressure of the yellow system and brake accumulators (3125 and 3126) (Ref. 29-10-00, P. Block 301).
Maintain the reservoir pressure (Ref. 29-14-00, P. Block 301) if you use the filling tube 98D29003502000 which is connected to the Green reservoir.
(b)Fill the system by opening the tool valve to the bleeders of the by-pass valve block. Hold the fluid flowrate until no more air bubbles go out of the bleeders of the reservoir 4300.
(c)Shut bleed valve J. Go on filling through bleed valve K check the flowrate. When no more air bubbles are observed, open bleed valve J (RH master cylinder system is bled).
(d)Shut bleed valve K. Go on filling through bleed valve J. When no more air bubbles are observed in the hydraulic fluid shut bleed valve J.



Low Pressure Braking System Bleeding and Replenishing
Figure 001



Low Pressure Braking System Bleeding and Replenishing
Figure 002

(LH master cylinder system is deaerated).

(e)Then the tank is full (tank piston in abutment). Fluid goes out of the tank bleeder left open. Shut the bleeder when the piston which moves reaches the green ring (correct level).

(f)Shut bleeders J and K of the by-pass valve block.

(g)Disconnect the supply pipes to the bleeders J and K on the by-pass valve block.

(h)Safety (with lockwire) the bleeder of the reservoir 4300.

(3)Replenishing

(a)Drop the pressure of the yellow system and brake accumulators (3125 and 3126) (Ref. 29-10-00, P. Block 301).
Maintain the reservoir pressure (Ref. 29-14-00, P. Block 301) if you use the filling tube 98D29003502000 which is connected to the Green reservoir.

(b)Fill the system by opening the tool valve to the bleeders of the by-pass valve block. Hold the fluid flowrate until no more air bubbles go out of the bleeders of the reservoir 4300.

(c)Shut bleed valve J. Go on filling through bleed valve K check the flowrate. When no more air bubbles are observed, open bleed valve J (RH master cylinder system is bled).

(d)Shut bleed valve K. Go on filling through bleed valve J. When no more air bubbles are observed in the hydraulic fluid shut bleed valve J. (LH master cylinder system is deaerated).

(e)Then the tank is full (tank piston in abutment). Fluid goes out of the tank bleeder left open. Shut the bleeder when the piston which moves reaches the green ring (correct level).

(f)Shut bleeders J and K of the by-pass valve block.

(g)Disconnect the supply pipes to the bleeders J and K on the by-pass valve block.

(h)Safety (with lockwire) the bleeder of the reservoir 4300.

(j)Install the plugs on the bleeders.

(k)Disconnect the hose from the reservoir 4300 and install the plug on the bleeders.

NOTE : Check the content of the Green reservoir (Ref. 29-00-00, P. Block 601).

R (l)On each brake unit, close the Yellow system bleeders. Remove the
R pressure gage and install plugs on the bleeders.

(4)Test

Carry out a test of pedal take-up travel, maximum pressure delivered to brakes and pressure return to zero. (Ref. 32-43-00, P. Block 501).

NOTE : If pressure delivered to brakes is less than that specified in the test, repeat the above procedure.

(5)Close-up

R
R (a)Disconnect vinyl tubing from reservoir bleeder and connect drain line.
R (b)Remove equipment and materials.
R (c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (d)Close access door 132AZ and 811.
R (e)Disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
R (f)Disconnect the supply lines from the Emergency brake distribution dual

valve bleeders and install protective caps on bleeders.

R (g)Pressurize hydraulic tanks (Ref. 29-14-00, P. Block 301).

WARNING : MAKE CERTAIN THAT DOOR TRAVEL RANGES ARE CLEAR.

R (h)Close landing gear doors (Ref. 32-12-11, P. Block 301).

R (j)Replenish hydraulic tanks as necessary (Ref. 12-12-29, P. Block 1).

R (k)Remove warning notice.

R (l)Close access doors, remove access platform and safety barriers.

R (m)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power replenishing equipment, all access equipment and miscellaneous items.

3. Topping-Up of Reservoir 4300

A. Reason for the Job

CAUTION : THIS PROCEDURE DOES NOT INCLUDE BLEEDING OF ALTERNATE BRAKE DISTRIBUTION DUAL VALVE SYSTEM, THE PROCEDURE IN NO WAY WHATSOEVER REPLACES THE PROCEDURE : ALTERNATE BRAKE DISTRIBUTION DUAL VALVE 3301 CONTROL SYSTEM REPLENISHING (REF. PARAGRAPH 2, ABOVE).

NOTE : - If low pressure reservoir is found completely empty, the referenced procedure AMM 12-12-32, P. Block 1, Para. 2 "Alternate brake distribution dual valve control system bleeding" should be performed to ensure that the system is free of air.
- If low pressure reservoir is not completely empty the referenced procedure AMM 12-12-32, P. Block 1, Para. 3 "Topping Up Reservoir 4300" may be accomplished.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform to Forward Cargo Compartment 2.60 m (8 ft. 7 in.)
(2)98A29001001000	Unit - Filling, Aircraft Brake System
(3)	Wheel Chocks
(4)	Vinyl Hose
(5)	Hydraulic Fluid Container
(6)Material No. 02-003 (de-aerated)	Hydraulic Fluids (Ref. 20-31-00)

C. Procedure

(Ref. Fig. 003)

(1)Job set-up

(a)Chock wheels.

(b)On panel 4VU

- make certain that landing gear control lever is in DOWN position and prohibit its operation by displaying a warning notice.

(c)On panel 9VU

- make certain that PARKING BRAKE control handle is in Normal (released) position.

(d)Position access platform at forward cargo compartment door.

(e)Open access doors 811 and 132AZ.

(2)Topping-up

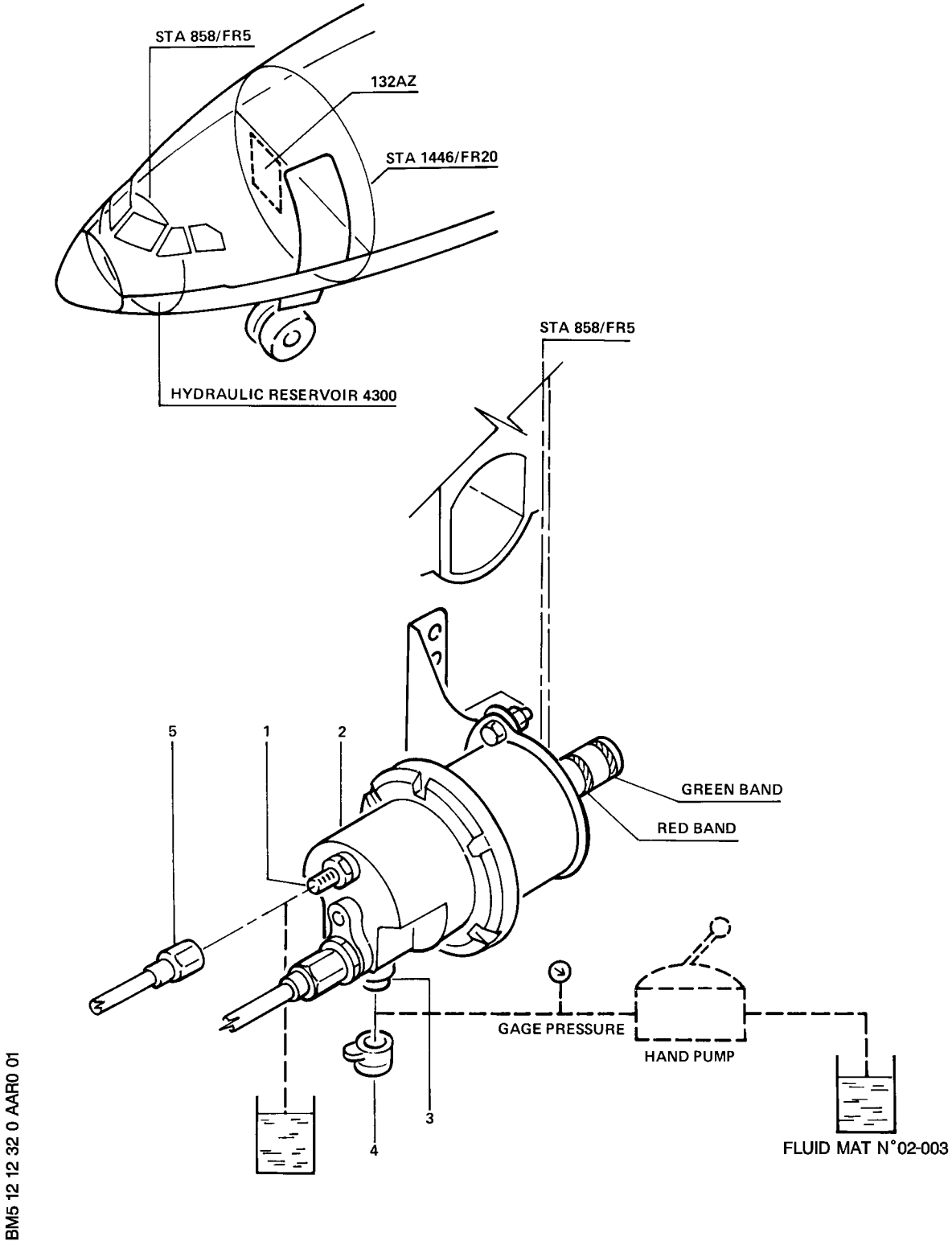
NOTE : Top up reservoir with de-aerated hydraulic fluid Material No.02-003 only.

(a)Disconnect drain line (5) from bleed valve (1), connect vinyl hose and submerge free end of hose in container filled with hydraulic fluid.

(b)Remove plug (4) from reservoir filling port (3).

(c)Connect filling unit hose to reservoir filling port.

NOTE : Make certain that filling unit hoses are filled with hydraulic fluid prior to connection and that air bubbles have been



Topping-Up of Reservoir 4300
Figure 003

expelled.

(d) Top up reservoir until completely full (piston in fully extented stop position) using hand pump and apply full strokes to pump handle until fluid flows from the vinyl hose without signs of air bubbles.
Make certain that delivery pressure does not exceed 4 bars (58 psi).

(e) Reduce reservoir fluid to normal level (piston guide-rod aligned with green ring) by opening bleed valve (1). Close bleed valve (1).

(f) Disconnect vinyl hose from reservoir bleed valve (1) and connect drain line (5) to bleed valve (1).

(g) Disconnect filling unit hoses from reservoir filling port and install plug (4) in port.

(3) Close-up

(a) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b) Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

4. Main Landing Gear Shock Absorber - Replenishing and Charging with Aircraft on Jacks

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

A. Reason for the Job

(1)Shock absorber replenishing

WARNING : SHOCK ABSORBER IS TO BE FILLED WITH HYDRAULIC FLUID MATERIAL No.02-001 OR No. 02-004 OR No. 02-006.

R (2)Hydraulic fluid materials

R NOTE : These three hydraulic fluids can be mixed with one another and
R in any quantity.

R (a)Charging after replenishing or when abnormal nitrogen pressure has been recorded.

NOTE : This method is simpler and more accurate than the method with the aircraft on its wheels but requires jacking up of the aircraft.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Air/Hydraulic Tool Kit (Nato Box)
(2)	Nitrogen Source
(3)	Access Platforms 2 m - 2.60 m (6 ft. 7in. - 8 ft. 7 in.)
(4)	Warning Notice
(5)	Safety Barriers
(6)Material No. 02-001	Hydraulic Fluids (Ref.20-31-00)
or	
Material No. 02-004	Hydraulic Fluids (Ref.20-31-00)
or	
Material No. 02-006	Hydraulic Fluids (Ref.20-31-00)
(7)H21824-1000	Filling Assembly
Referenced Procedures	
- 07-11-00, P. Block 1	Jacking for Aircraft Maintenance Operations
- 32-12-11, P. Block 301	(Main Gear Main Door - Ground Door(s) Opening)

C. Procedure

(1)Job set-up

(a)On panel 4VU

- make certain that landing gear control lever is in **DOWN** position and prohibit its operation by displaying a warning notice.

(b)Between the First Officer's and Third Occupant's seats

- make certain that landing gear Free Fall extension control handle

is in normal position.

(c)Position access platforms.

(d)Position safety barriers prohibiting access to gear door travel ranges.

WARNING : MAKE CERTAIN THAT THE DOOR TRAVEL RANGES ARE CLEAR.

(e)Open main gear doors (Ref. 32-12-11, P. Block 301).

WARNING : WHEN DOORS ARE OPEN MAKE CERTAIN THAT SAFETY COLLARS ARE POSITIONED ON DOOR ACTUATING CYLINDERS.

(f)Jack up aircraft until wheels are clear of ground (Ref. 07-11-00, P.Block 1).

(2)Shock absorber replenishing (Ref. Fig. 004, 005)

(a)Preparation of replenishing system

1 Assemble the replenishing system using items taken from air/ hydraulic tool kit.

- Connect suction line (11) to hand pump (12) and hydraulic fluid source (10) (hydraulic fluid Material No. 02-001 or No. 02-004 or No. 02-006).
- Connect line (13) to hand pump (12) outlet and to three-way valve (7) (supply port).
- Connect line (5) to three-way valve (7) (delivery port) and to adaptor (4).
- Connect line (8) to three-way valve (7) (bleed port) and to drain pan (9).
- Install pressure gage (6) (0 to 50 bars) (0 to 725 psi).

2 Bleed the system by slowly operating hand pump (12) and by opening the two valves A and B of the three-way valve (7). Then, close valves A and B.

3 Remove protective cap, from charging valve and the cap (3) of valve (1).
Install filling assembly H21824 - 1000 valve (1).
Connect adaptor (4) to filling assembly and line (5) to adaptor.
Hand tighten adaptor knurled nut.

(b)Release of shock absorber pressure.

1 Unscrew charging valve (1) control nut (2) by one and a half turns.

2 Gradually open valve B of three-way valve (7).

3 When pressure is fully released, close valve B.

(c)Topping up or replenishing with hydraulic fluid

1 Using wheel changing jacks, compress the shock absorber by 400 mm (15.748 in.)

2 Open valve A of three-way valve and operate hand pump (12). Open valve B from time to time in order to bleed air from the shock absorber.

3 Slowly increase the pressure and stop the topping up operation.

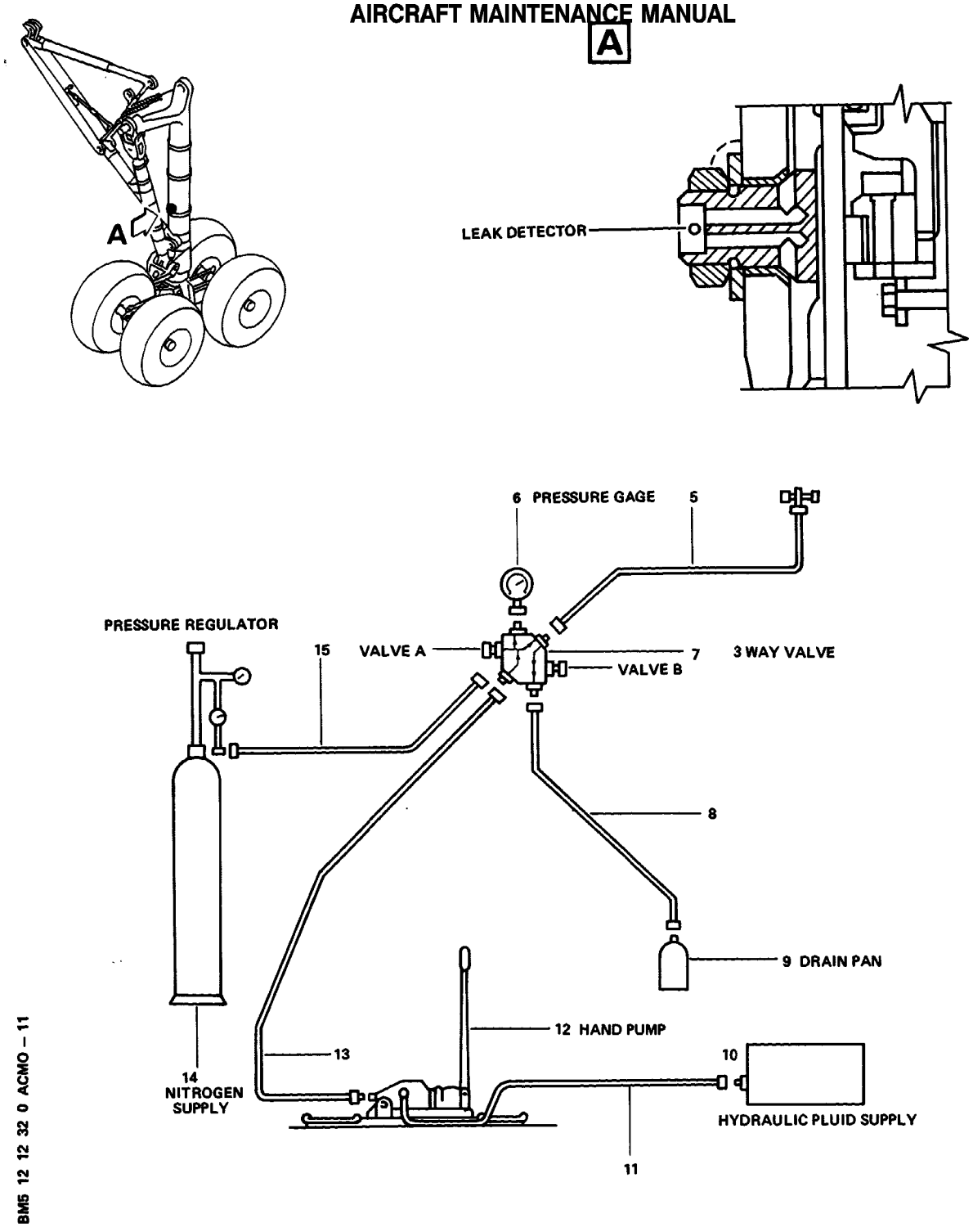
4 Operate the jack and fully compress shock absorber ; 450 mm (17.716 in.).

NOTE : Check that the surplus fluid discharged throught the bleed tubing (8) shows no sign of emulsion. Repeat replenishing operation as required, until the fluid expelled is free from air bubbles.

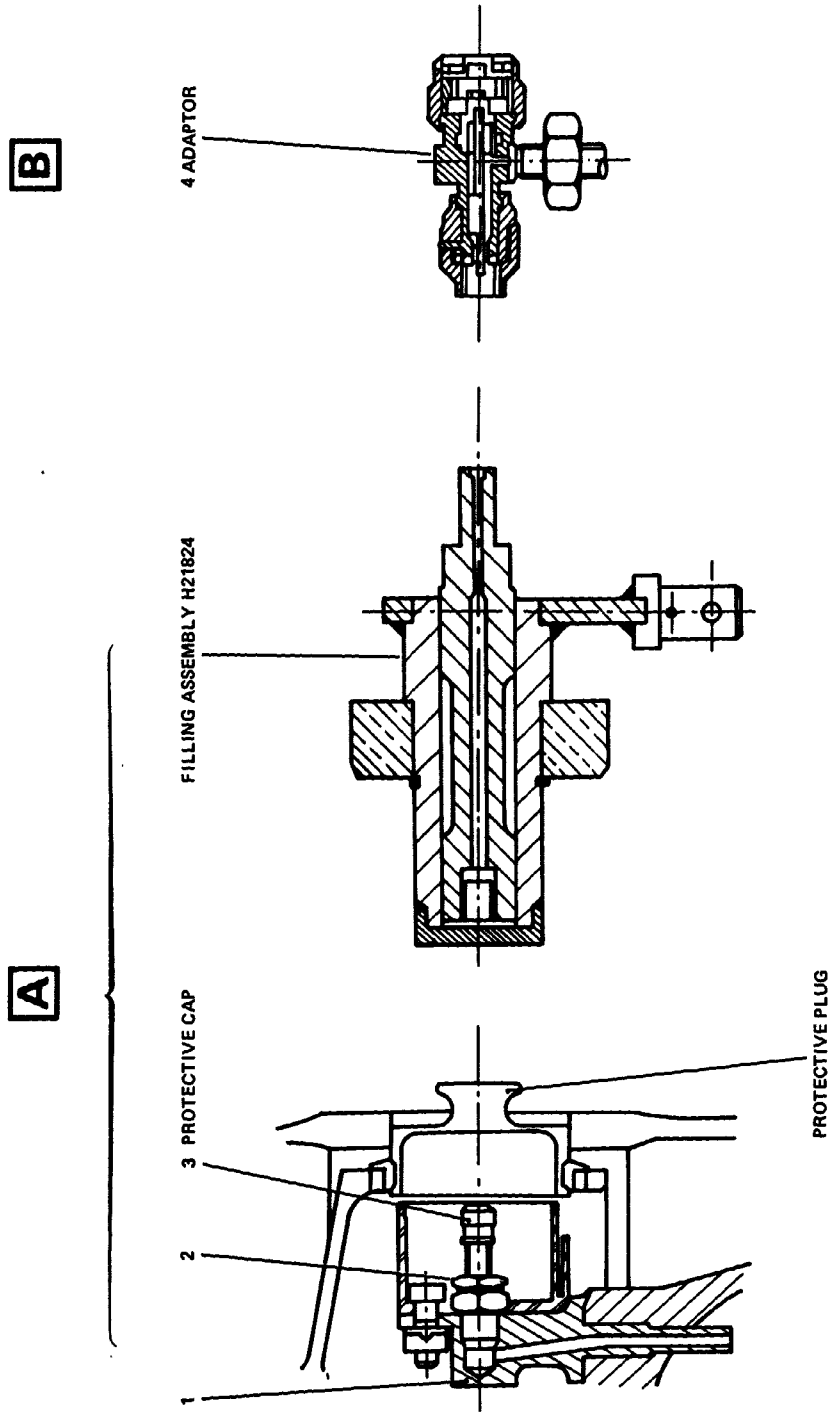
(d)Shock absorber fluid level adjustment

1 Close charging valve (1) by screwing down control nut (2) and close valve B.

2 Disconnect the hydraulic supply and connect the nitrogen supply.



Main Gear Shock Absorber - Replenishing and Charging
Figure 004



Main Gear Shock Absorber - Replenishing and Charging System
Figure 005

- Disconnect line (13) from three-way valve (7).
- Connect line (15) to three-way valve and to nitrogen supply (14).

3 Loosen charging valve (1) control nut (2) by one turn and a half and open valve A.

4 Lightly pressurize, 5 bars (72.5 psi), shock absorber with nitrogen.

5 Shut down nitrogen supply, close valve A and open valve B.

6 Bleed off surplus fluid and nitrogen into drain pan (9). When flow stops, close charging valve (1) and valve B ; fluid level is correct. TORQUE nut (2) to between 0.5 and 0.8m.daN (44.235 and 70.776 lbf. in.).

7 Extend the shock absorber and remove wheel changing jacks.

(e)Charge shock absorber

(3)Charging of shock absorber (Ref. Fig. 004, 005)

(a)Preparation of charging system

1 Assemble charging system using components taken from air/hydraulic tool kit.

- Connect line (15) to nitrogen supply incorporating a pressure regulator (14) and three-way valve (7) (supply port).
- Connect line (8) to three-way valve (7) (bleed port) and drain pan (9).
- Connect line (5) to three-way valve (7) (delivery port) and adaptor (4).
- Install pressure gage (6).

2 Open three-way valve valves A and B and apply nitrogen pressure to bleed system.

3 Close valves A and B. Remove charging valve (1) protective cap (3). Connect filling assembly and adaptor (4).

(b)Unscrew charging valve control unit. Close valve A.

(c)Gradually increase the pressure through pressure regulator. Charge fully extended shock absorber to 22 bars (319 psi).

NOTE : This pressure is specified for an ambient temperature of 15° ± 5° C.

(d)Close charging valve (1).
TORQUE nut (2) to between 0.5 and 0.8 m.daN (44.235 and 70.776 lbf. in.).

(e)Close nitrogen supply valve. On pressure regulator reduce pressure to zero.

(f)Open valve B on three-way valve so that regulated pressure drops to zero.

(g)Disconnect and remove charging system filling assembly and adaptor (4).

(h)Check charging valve (1) for leakage and install protective cap (3). and plug.

(4)Close-up

(a)Remove hydraulic fluid drain pan.

(b)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

WARNING : MAKE CERTAIN THAT DOOR TRAVEL RANGES ARE CLEAR.

(c)Lower the aircraft onto its wheels (Ref. 07-11-00, P. Block 1).

(d)Close landing gear doors (Ref. 32-12-11, P. BLock 301).

(e)Remove warning notices.

(f)Close access doors, remove access platforms and safety barriers.
(g)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

5. Main Landing Gear Shock Absorber - Topping Up and Charging with Aircraft on its Wheels

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

A. Reason for the Job

(1)Fluid is to be topped up whenever leakage has been noted.

WARNING : SHOCK ABSORBER IS TO BE FILLED WITH HYDRAULIC FLUID MATERIAL No. 02-001 OR No. 02-004 OR No. 02-006.

(2)Shock absorber is to be charged whenever abnormal nitrogen pressure has been recorded (abnormal shock absorber compression versus load).

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Air/Hydraulic Tool Kit (Nato Box)
(2)	Nitrogen Source
(3)Material No. 02-001	Hydraulic fluids (Ref. 20-31-00)
or	
Material No. 02-004	Hydraulic fluids (Ref. 20-31-00)
or	
Material No. 02-006	Hydraulic fluids (Ref. 20-31-00)
(4)	Access Platform 2 m (6 ft. 7 in.)
(5)H21824-1000	Filling Assembly

C. Procedure

(1)Job set-up

(a)On panel 4VU

- make certain that landing gear control lever is in **DOWN** position

(b)Position access platform.

(2)Fluid topping up (Ref. Fig. 004)

(a)Preparation of supply system

1 Assemble the replenishing system using items taken from air/hydraulic tool kit.

- Connect suction line (11) to hand pump (12) and hydraulic fluid source (10) (hydraulic fluid Material No. 02-001 or No. 02-004 or No. 02-006).
- Connect line (13) to hand pump (12) outlet and to three-way valve (7) (supply port).

NOTE : Suction line (13) must be 5 meters long (196.85 in.).

- Connect line (5) to three-way valve (7) (delivery port) and to adaptor (4).
- Connect line (8) to three-way valve (7) (bleed port) and to drain pan (9).
- Install a pressure gage (6) (0 to 100 bars) (0 to 1450 psi).

2 Bleed the system by operating hand pump (12) slowly and by opening the two valves A and B of three-way valve (7).
Then close valves A and B.

3 Remove protective plug and protective cap (3) from charging valve (1). Connect filling assembly H21824 - 1000. Connect the system by

screwing adaptor (4) to filling assembly. Hand tighten adaptor knurled nut.

(b)Depressurization of shock absorber

1 Unscrew charging valve (1) control nut (2) by one and a half turns with the arm of the filling assembly.

2 Gradually open valve B of three-way valve (7) and allow the shock absorber to compress slowly to the mechanical stop.

WARNING : DURING THIS OPERATION, TAKE ALL NECESSARY PRECAUTIONS TO AVOID ANY ACCIDENT IN CASE OF SUDDEN DEPRESSURIZATION OF SHOCK ABSORBER.

3 When pressure is fully released, close valve B.

(c)Fluid topping-up

1 Open valve A of three-way valve (7) and operate hand pump (12).

2 Stop operating hand pump, when the shock absorber is extented by 20 mm (0.8 in) approximately and close valve A.

3 Open valve B slightly and allow the shock absorber to compress slowly until it reaches end-of-travel.

NOTE : Check that the surplus fluid discharged through bleed line (8) shows no sign of emulsion.
Repeat topping up operations, as necessary until the fluid expelled is free from air bubbles.

4 Close valve B when the shock absorber comes to stop position and fluid flow stops.

(d)Fluid level adjustment

1 Disconnect hydraulic supply line and connect nitrogen supply line.
- Disconnect line (13) from three-way valve (7).
- Connect line (15) to the three-way valve and to nitrogene source (14).

2 Open valve A and pressurize the shock absorber with nitrogen (5 bars) (72.5 psi).

3 Shut down the nitrogen supply, close valve A and open valve B.

4 Bleed off surplus fluid and nitrogen into drain pan (9). When flow stops close charging valve (1) and valve B : Fluid level is correct. TORQUE nut (2) using arm of filling assembly to between 0.5 and 0.8 m.daN (44.235 and 70.776 lbf. in.).

(e)Charge shock absorber.

(3)Charging of shock absorber

(Ref. Fig. 006)

(a)Preparation of charging system

1 Assemble charging system using components taken from air/hydraulic tool kit.
- Connect line (15) to nitrogen supply incorporating pressure regulator (14) and three-way valve (7) (supply port).
- Connect line (8)to three-way (7) (bleed port) and drain pan (9).
- Connect line (5) to three-way valve (7) (delivery port) and adaptor (4).
- Install pressure gage (6).

2 Open three-way valve (7) valves A and B and apply nitrogen pressure to bleed system.

3 Close valves A and B. Connect filling assembly. Remove charging

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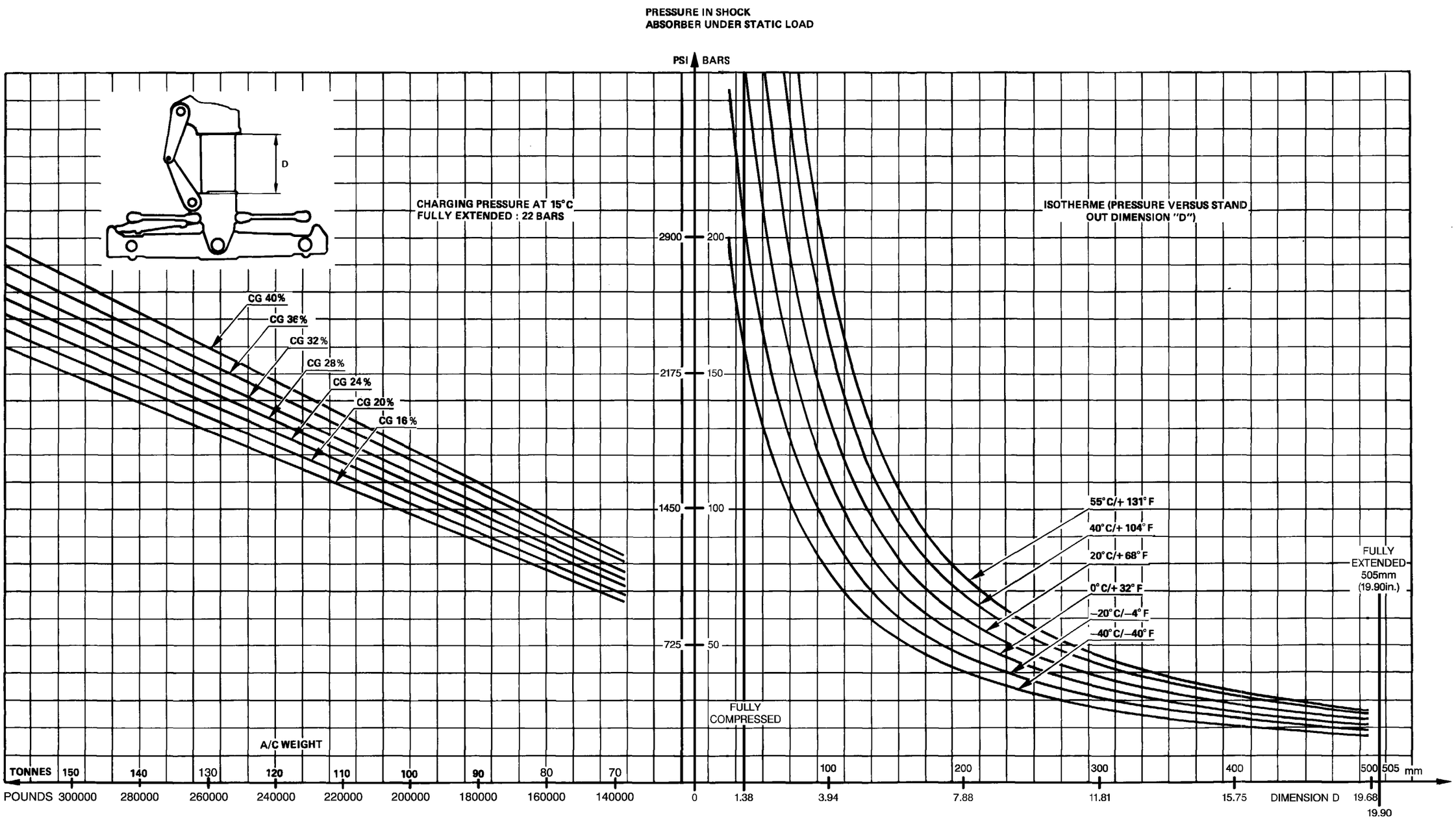

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Main Gear Shock Absorber - Charging Chart
Figure 006

R

valve (1) protective cap (3) and connect adaptor (4).

(b) Unscrew charging valve (1) control nut (2) by one and a half turns and unscrew valve A.

(c) Gradually charge shock absorber with nitrogen through pressure regulator according to load and ambient temperature.
Shock absorber extends slowly. When dimension D according to load is achieved, close three-way valve (7) valve A.

(d) Close charging valve (1).
TORQUE nut (2) to between 0.5 and 0.8 m.daN (44.235 and 70.776 lbf. in.).

(e) Close nitrogen supply valve. On pressure regulator reduce pressure to zero.

(f) Open valve B on three-way valve so that regulated pressure drops to zero.

(g) Disconnect and remove charging system.

(h) Check charging valve (1) for leakage and install protective cap (3).
NOTE : If valve is defective, depressurize shock absorber, replace and fully tighten valve : TORQUE to between 1 and 1.25 m.daN (88.47 and 110.58 lbf.in.).

(j) Check leak detector for traces of fluid leakage (Ref. Fig. 004)

(4) Close-up

(a) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b) Remove access platforms.

(c) Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

6. Not applicable

7. Not applicable

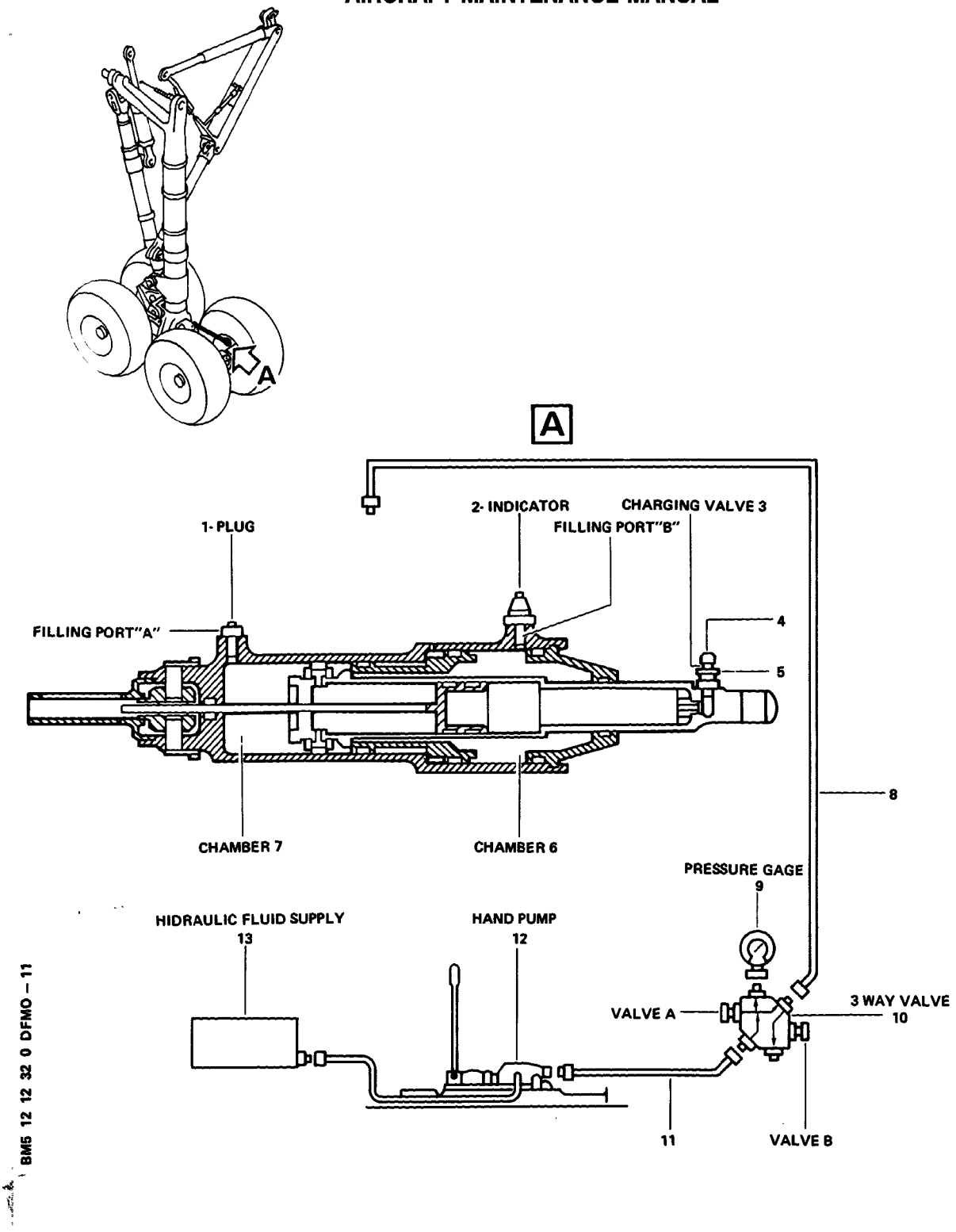
8. Replenishing of Pitch Damper with Fluid Level Indicator
   WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

   A. Reason for the Job
      WARNING : PITCH DAMPER IS TO BE FILLED WITH HYDRAULIC FLUID, MATERIAL No. 02-001 OR No. 02-004 OR No. 02-006.
      (1)Replenishing of pitch damper will be carried out when fluid level indicator rod is in red zone. This indicates that pitch damper fluid reserve has decreased to a value which does not ensure correct operation.
      NOTE : Pressure drop indicator serves to indicate that pitch damper pressure has decreased to a value that no longer ensures correct operation.
      Fluid level indicator indicates hydraulic fluid leakage, topping up of pitch damper may be considered as a temporary measure enabling a few flights before replacement of pitch damper.

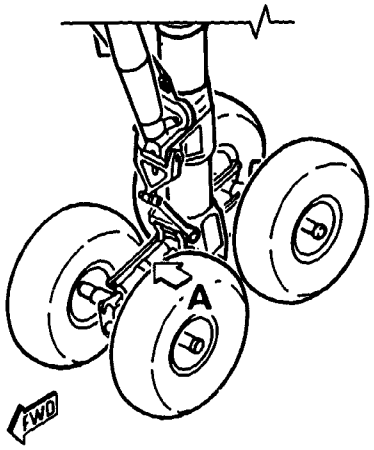
   B. Equipment and Materials

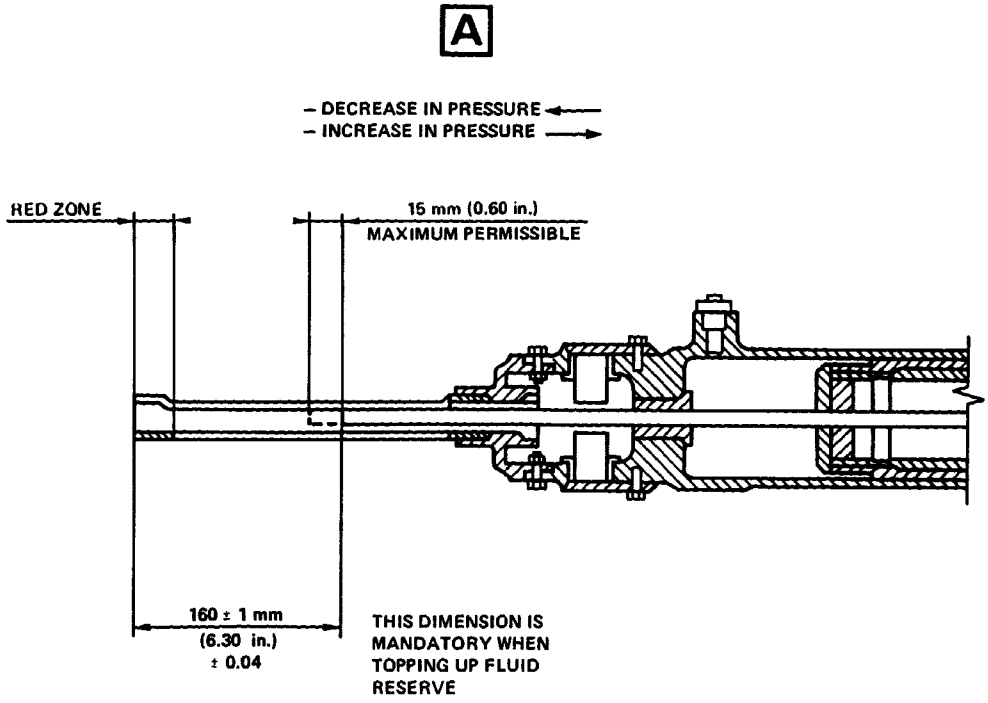
ITEM	DESIGNATION
1.	Air/Hydraulic Tool Kit (Nato Box)
2. SK2-20413	Filler Adaptors
3.	Nitrogen Source
4. Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)
or Material No. 02-004	Hydraulic Fluids (Ref. 20-31-00)
or Material No. 02-006	Hydraulic Fluids (Ref. 20-31-00)

   C. Pitch Damper Fluid Level Check and Replenishing
      (1)Procedure.
         (Ref. Fig. 007, 008, 009)
         (a)The following operations shall be carried out with aircraft on its wheels or on jacks.
         (b)Depressurize pitch damper by gradually opening valve (3).
            CAUTION : - WHEN THE AIRCRAFT IS ON JACKS WITH PITCH DAMPER DEPRESSURIZED, PLACE A JACK UNDER EACH END OF THE BOGIE BEAM TO MAINTAIN BOGIE BEAM IN HORIZONTAL POSITION. THIS PREVENTS UNTIMELY TILTING OF BOGIE BEAM AND MAINTAINS PITCH DAMPER IN A POSITION FACILITATING REPLENISHING.
            TO DETERMINE BOGIE BEAM HORIZONTAL POSITION SET PITCH DAMPER ROD STANDOUT LENGTH TO GIVEN VALUE. DIMENSION X ON FIGURE = 62 ± 2mm (2.44 ± 0.08 in.). (DISTANCE BETWEEN GUIDE END AND CHARGING VALVE AXIS).
            - WHEN THE AIRCRAFT IS ON ITS WHEELS ON AN UNEVEN RUNWAY, CHECK DIMENSION X = 62mm ± 2mm (2.44 in. ± 0.08 in.)



Pitch Damper - Replenishing
Figure 007





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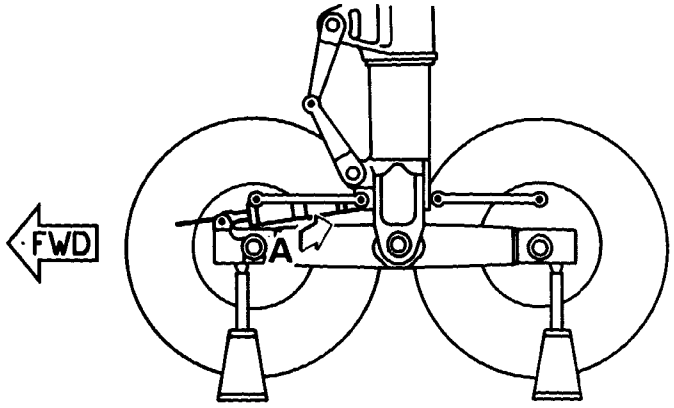
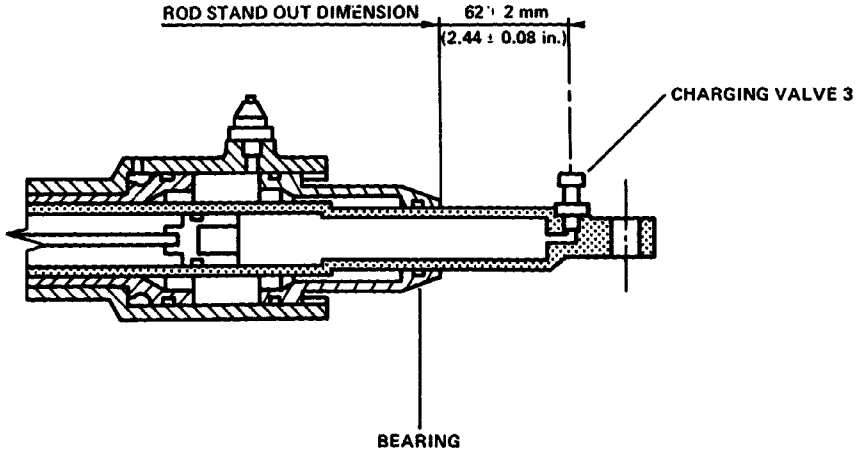
Pitch Damper - Fluid Level Indicator
Figure 008



AIRCRAFT ON JACKS
BOGIE BEAM IN HORIZONTAL POSITION

A



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Pitch Damper Configuration - Topping - Up with A/C on Jacks
Figure 009

(DISTANCE BETWEEN GUIDE AND CHARGING VALVE AXIS). LIFT BOGIE BEAM SLIGHTLY, IF NECESSARY, TO OBTAIN THIS DISTANCE.

(c)Remove plug (1) from filling port (A) and install filler adaptor SK2-20413.

(d)Using items from air/hydraulic tool kit, connect a line to adaptor to allow fluid to flow from port (A).

(e)Charge to a pressure of 5 bars (72.5 psi) via valve (3) to bring separator piston into contact, cylinder side, while allowing excess fluid to flow through the line connected to port (A). Close valve (3) to maintain pressure in nitrogen chamber.

(f)Remove pressure drop indicator (2) from port (B) and install a filler adaptor SK2-20413.
Connect a transparent hose to adaptor to allow fluid to flow from port (B).

(g)Supply fluid via port (A) and allow excess fluid to flow to return through the hose connected to port (B).
NOTE : Flow of fluid between the two ports must be slow but constant to achieve efficient bleeding of pitch damper.

(h)Continue to bleed pitch damper until fluid expelled through the transparent hose is free from emulsion and air bubbles.

(j)Shut down supply to port (A) then remove transparent hose and adaptor SK2-20413 from port (B).

(k)Allow pitch damper to rest in this position for 15 minutes to allow evacuation of air through port (B). If necessary, top up fluid level through port B using a test tube.
NOTE : The fluid level must be stabilized at the bottom of port (B).

(l)Install pressure drop indicator (2) and TORQUE to 1.5 m.daN (11.06 lbf.ft).

(m)Top up fluid reserve.
- Open charging valve (3) to depressurize nitrogen chamber.
- Slowly and gradually supply fluid through port (A) until the end of fluid level indicator rod is at a distance of 160 ± 1mm (6.3 ± 0.04 in.) from end of protective tube.

CAUTION : THE DISTANCE OF 160 ± 1mm RELATING TO TOPPING UP OF FLUID RESERVE IN PITCH DAMPER CORRESPONDS TO BOGIE BEAM HORIZONTAL POSITION.

- Shut down supply to port (A).

(n)Remove line and adaptor SK2-20413 and immediately install plug (1). TORQUE plug (1) to 1.5 m.daN (11.06 lbf.ft).

D. Close-Up
(1)Charge pitch damper (Ref. para. 10).

9. Not applicable

10. Pitch Damper with Fluid Level Indicator - Charging
WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

A. Reason for the Job

(1)Pitch damper shall be charged :
- after replacement
- after replenishing
- after detection of leakage at charging valve indicated by pressure drop indicator (red indicator).

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Air/Hydraulic Tool Kit (Nato Box)
(2)	Nitrogen Source

C. Procedure
(Ref. Fig. 011, 008)
(Ref. Fig. 010)
(1)Preparation of charging system
- Assemble the charging system using items taken from air/hydraulic tool kit.
- Connect line (2) to nitrogen supply (1) incorporating pressure regulator and three-way valve (4) (supply port).
- Remove protective cap (6) from charging valve (7) and connect line (5) to three-way valve (4) (delivery port) and charging valve (7).
- Install pressure gage (3).
- Open three-way valve (4) valve A, with valve B closed.
- Slowly unscrew charging valve (7) control nut (8) (charging valve open).

(a)Procedure may be performed with aircraft on wheels or on jacks.

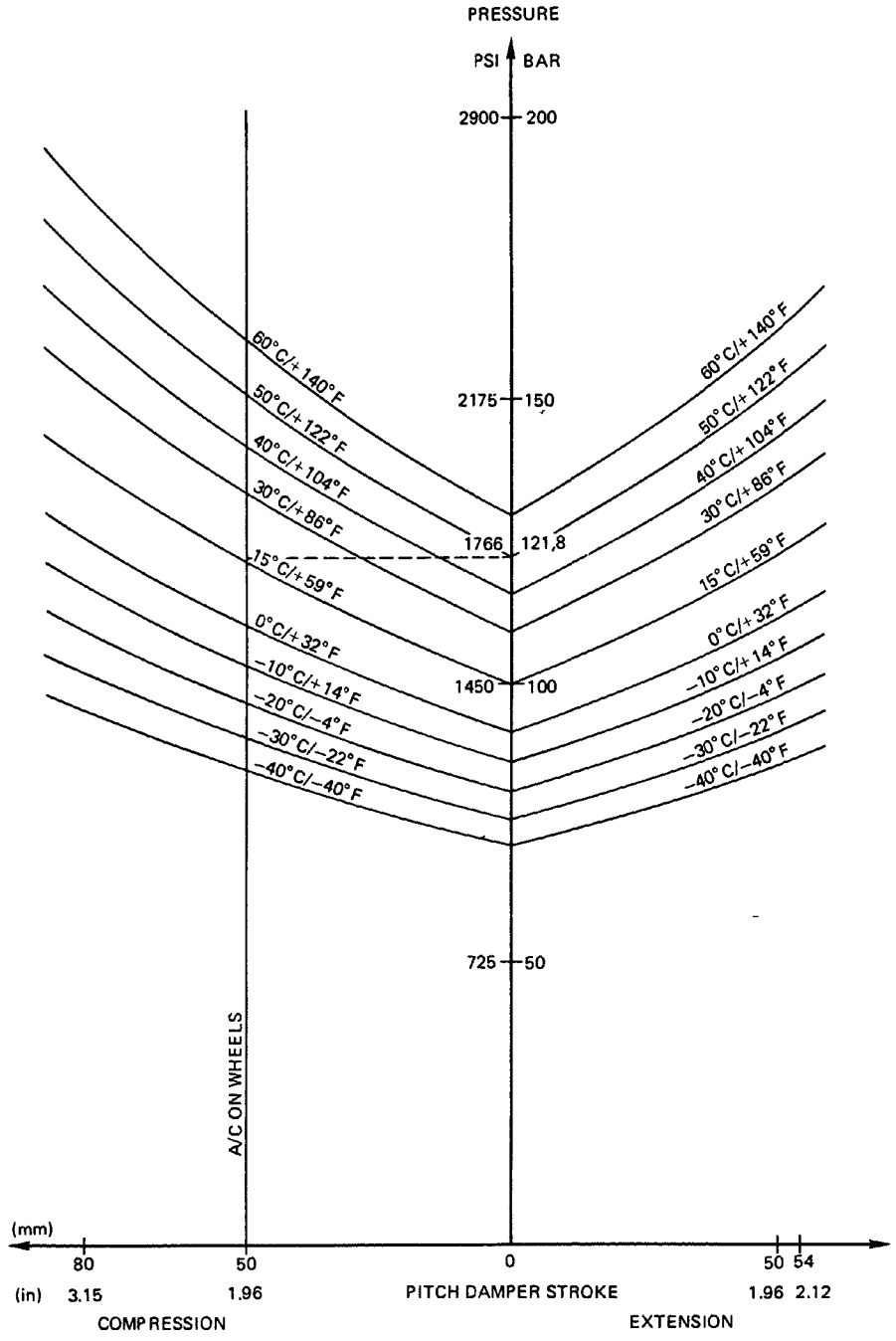
1 Aircraft on Jacks
- Before charging, remove the two jacks holding bogie beam, avoiding untimely tilting and charge slightly via valve A to enable pitch damper to return to neutral position (bogie beam "nose down" forwards).
- Note fluid level indicator rod position.
- Gradually charge pitch damper through valve A to a pressure of 100 ± 5 bar (1450 ± 72.5 psi) for ambient temperature of 15°C (59°F) and check that displacement of fluid level indicator rod does not exceed 15mm (0.60 in).

2 Aircraft on Wheels
Gradually charge pitch damper with nitrogen through valve A to a pressure of 122 ± 5 bars (1769 ± 72.5 psi) for ambient temperature of 15°C (59°F) and check that displacement of fluid level indicator rod does not exceed 15mm (0.60 in).

NOTE : If fluid level indicator displacement rod exceeds 15mm (0.60 in.) during pressurization of pitch damper this indicates that pitch damper contains a volume of air such that correct operation of pitch damper is no longer ensured. If this is the case, perform the operations detailed in paragraph 8.

(b)Close valve A and TORQUE nut to between 0.5 and 0.85 m.daN (3.69 and 6.29 lbf.ft.). Check that valve does not leak.

(c)Reset pressure drop indicator (2) by pressing the red indicator.



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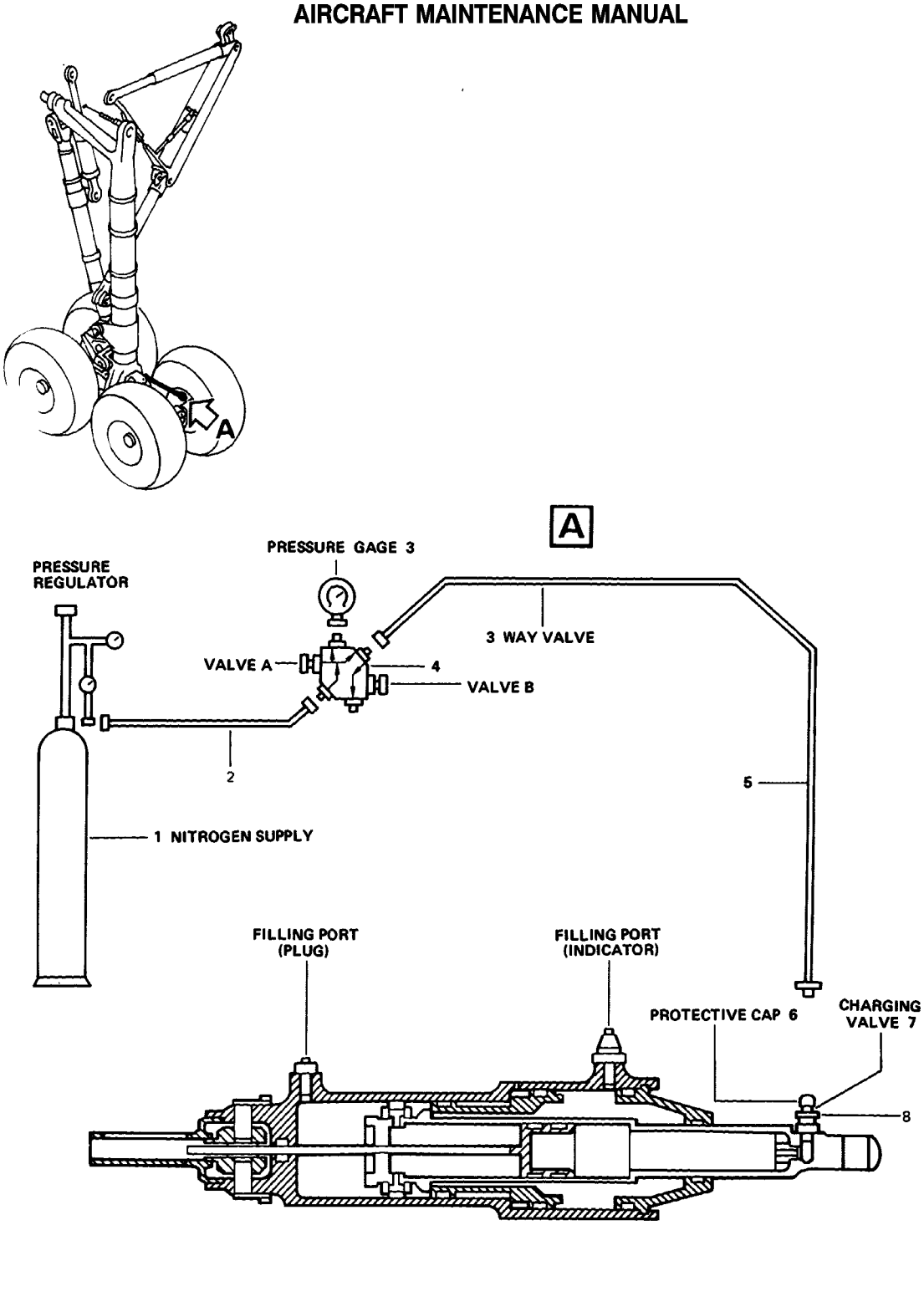
Pitch Damper with Fluid Level Indicator - Charging Chart
Figure 010



Pitch Damper - Charging
Figure 011

(d)Safety pressure drop indicator (2) and plug (1).
(e)Shut off nitrogen supply. On pressure regulator reduce pressure to zero.
(f)On three-way valve, open valve B so that regulated pressure drops to zero.
(g)Disconnect charging system and check that valve does not leak.
(h)Install protective cap (6).
(j)Make certain that filling ports are free from leaks.

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove all ground handling and maintenance equipment standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

11.Nose Gear Shock Absorber - Replenishing and Charging with Aircraft on Jacks
(Ref. Fig. 012)
WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH ACTUAL POSITION OF THE SERVICES THEY OPERATE.

A. Reason for the Job
(1)Shock absorber replenishing.
WARNING : SHOCK ABSORBER IS TO BE FILLED WITH HYDRAULIC FLUID MATERIAL No. 02-001 OR No. 02-004 OR No. 02-006.
(2)Shock absorber charging after replenishing or when abnormal nitrogen pressure has been recorded.
NOTE : This method is simpler and more accurate than the method with the aircraft on its wheels but requires jacking up of the aircraft.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Air/Hydraulic Tool Kit (Nato box)
(2)Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)
or Material No. 02-004	Hydraulic Fluids (Ref. 20-31-00)
or Material No. 02-006	Hydraulic Fluids (Ref. 20-31-00)
(3)	Access Platforms 2 m - 2.60 m (6 ft. 7 in. - 8 ft. 7 in.)
(4)	Warning Notices
(5)	Safety Barriers
Referenced Procedures	
- 07-11-00, P. Block 1	Jacking for Aircraft Maintenance Operations
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

ITEM	DESIGNATION
- 32-22-11, P. Block 301	Nose Gear Main Door - (Ground Door(s) Opening)

C. Procedure
(1)Job set-up
(a)On panel 4VU
- make certain that landing gear control lever is in **DOWN** position and prohibit its operation by displaying a warning notice.

(b)Between First Officer's and Third Occupant's seats
- make certain that Free Fall extension control handle is in Normal position.

(c)Position access platform.
(d)Position safety barriers prohibiting access to gear door travel ranges.
WARNING : MAKE CERTAIN THAT THE DOOR TRAVEL RANGES ARE CLEAR.
(e)Open main and nose gear doors (Ref.32-12-11, P. Block 301 and 32-22-11, P. Block 301).
WARNING : WHEN DOORS ARE OPEN MAKE CERTAIN THAT SAFETY COLLARS ARE POSITIONED ON DOOR ACTUATING CYLINDERS.
(f)Jack up aircraft until wheels are clear of ground (Ref. 07-11-00, P. Block 1).
(2)Replenishing of shock absorber
(Ref. Fig. 012)
(a)Preparation of replenishing system
- Assemble the replenishing system using items taken from air/hydraulic tool kit.
- Connect suction line (11) to hand pump (12) and hydraulic fluid supply (10) (hydraulic fluid Material No. 02-001 or No. 02-004 or No. 02-006).
- Connect line (13) to hand pump (12) outlet and to three-way valve (7) (supply port).
- Connect line (5) to three-way valve (7) (delivery port) and to adaptor (4).
- Connect line (8) to three-way valve (7) (bleed port) and to drain pan (9).
- Install pressure gage (6) (0 to 50 bars) (0 to 725 psi).

1 Bleed the system by operating hand pump (12) slowly and by opening the valves A and B of three-way valve (7). Then close valves A and B.
2 Remove protective cap (3) from charging valve (1). Connect the system by connecting adaptor knurled nut.

(b)Release of shock absorber pressure.
1 Cut lockwire and unscrew charging valve (1) control nut (2) by one and a half turns.
2 Gradually open valve B of three-way valve (7).
3 Compress the shock absorber by 400 mm (15.748 in.) using wheel changing jack.
4 When pressure is fully released, close valve B.

(c)Topping up or replenishing with hydraulic fluid.
1 Open valve A of three-way valve (7) and operate hand pump (12). During replenishing, do not exceed pressure of 25 bars by opening

valve B from time to time.

2 Before compressing the shock absorber, open valve B to enable surplus fluid to be released.

3 Operate jack and compress the shock absorber until it reaches end-of-travel.

NOTE : Check that the surplus fluid discharged through bleed line (8) shows no signs of emulsion.
Repeat replenishing operation as required until the fluid discharged is free from air bubbles.

4 Extend shock absorber and remove wheel changing jack. Before charging shock absorber, make certain that it is fully extended.

(d)Charge shock absorber.

(3)Charging of shock absorber
(Ref. Fig. 012)

(a)Preparation of charging system

1 Assemble charging system using items taken from air/hydraulic tool kit.

- Connect line (15) to nitrogen supply (14) incorporating pressure regulator and three-way valve (7) (supply port).
- Connect line (8) to three-way valve (7) (bleed port) and drain pan (9).
- Connect line (5) to three-way valve (7) (delivery port) and adaptor (4).
- Install pressure gage (6).

2 Open three-way valve (7) valves A and B and apply nitrogen pressure to bleed system.

3 Close valves A and B. Remove charging valve (1) protective cap (3) and connect adaptor (4).

(b)Cut lockwire and unscrew charging valve (1) control nut (2) by one and a half turns.

(c)Gradually increase nitrogen pressure. Charge fully extended shock absorber, total travel 450 mm (17.71 in.) to 16.5 bars (239 psi).

NOTE : This pressure is for an ambient temperature of 15° ±5°C (59° ±9°F).

(d)Close charging valve (1).
TORQUE nut (2) to between 0.5 and 0.8 m.daN (44.235 and 70.776 lbf. in.). Wirelock nut (2).

(e)Close nitrogen supply valve. On pressure regulator reduce pressure to zero.

(f)On three-way valve, open valve B so that regulated pressure drops to zero.

(g)Disconnect and remove charging system.

(h)Check charging valve (1) for leakage and install protective cap (3).

(4)Close-up

WARNING : MAKE CERTAIN THAT AREA UNDER AIRCRAFT IS CLEAR.

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Lower aircraft onto its wheels (Ref.07-11-00, P. Block 1).

WARNING : MAKE CERTAIN THAT DOOR TRAVEL RANGES ARE CLEAR.

(c)Close nose and main gear doors (Ref. 32-12-11, P. Block 301 and 32-22-11, P. Block 301).

(d)Remove warning notices.
(e)Close access doors. Remove access platforms and safety barriers.
(f)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

12. Nose Gear Shock Absorber - Replenishing and Charging, Aircraft on Wheels
(Ref. Fig. 012)

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

A. Reason for the Job

(1) Fluid is to be topped up whenever leakage has been noted.

WARNING : SHOCK ABSORBER IS TO BE FILLED WITH HYDRAULIC FLUID MATERIAL No. 02-001 OR No. 02-004 OR No. 02-006.

(2) Shock absorber is to be charged whenever abnormal nitrogen pressure has been recorded (abnormal shock absorber compression versus load).

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Air/Hydraulic Tool Kit (Nato Box)
(2)	Nitrogen Source
(3) Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)
or Material No. 02-004	Hydraulic Fluids (Ref. 20-31-00)
or Material No. 02-006	Hydraulic Fluids (Ref. 20-31-00)
(4)	Access Platforms (2 m to 2.60 m) (6 ft. 7 in. to 8 ft. 7 in.)
(5)	Safety Barriers
(6)	Warning Notice
Referenced Procedure	
- 32-21-14, P. Block 601	Nose Gear Shock Absorber
- 32-22-11, P. Block 301	Nose Gear Main Door - (Ground Door(s) Opening)

C. Procedure

(1) Job set-up

(a) On panel 4VU
- make certain that landing gear Normal control lever is in DOWN position.

(b) Between First Officer's and Third Occupant's seats
- make certain that Free Fall Extension control handle is in Normal position.

(c) Position access platforms.

(d) Position safety barriers prohibiting access to nose gear door travel ranges.

WARNING : MAKE CERTAIN THAT DOOR TRAVEL RANGES ARE CLEAR.

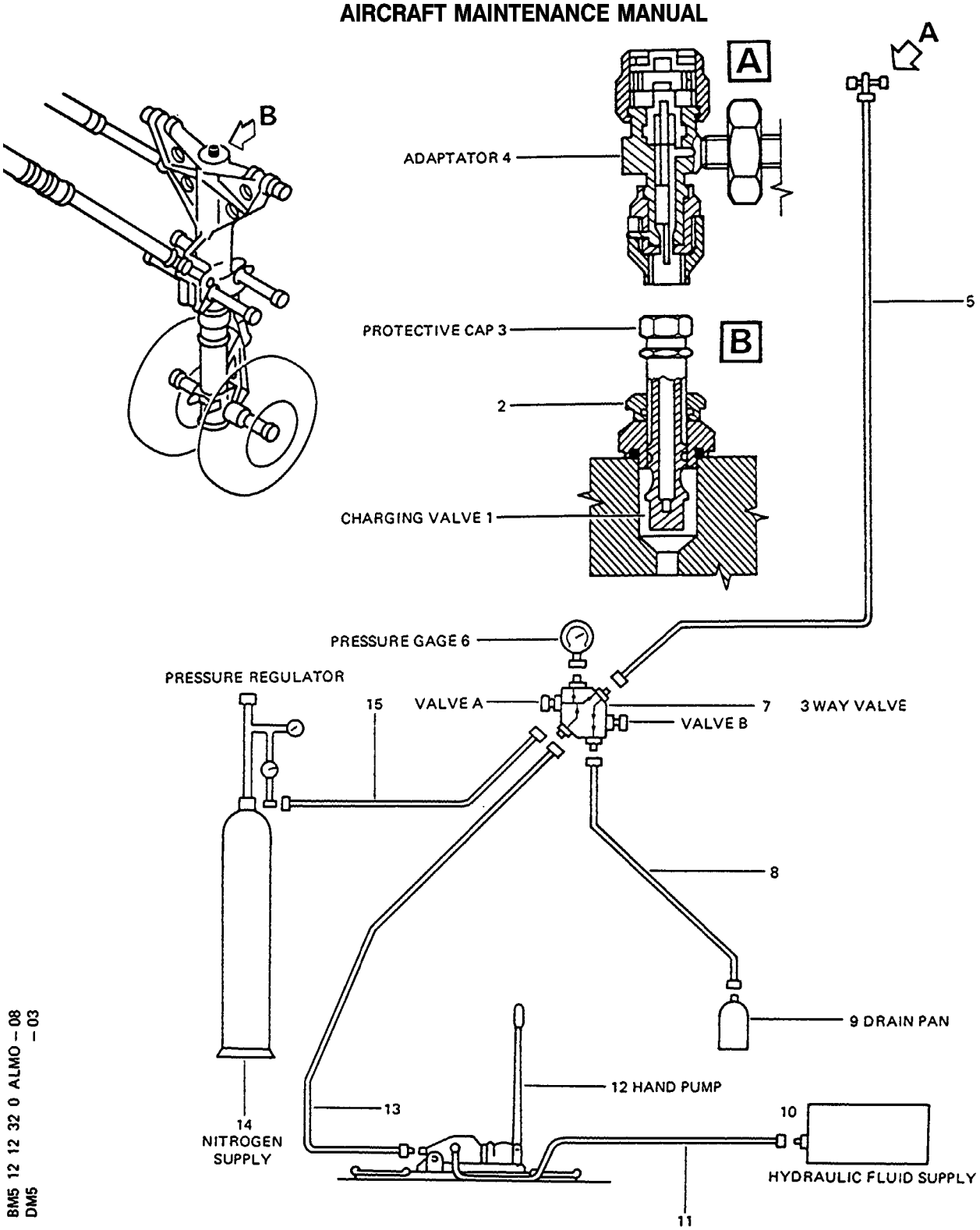
(e) Open nose gear doors (Ref. 32-22-11, P. Block 301).

WARNING : WHEN DOORS ARE OPEN MAKE CERTAIN THAT SAFETY COLLARS ARE POSITIONED ON DOOR ACTUATING CYLINDERS.

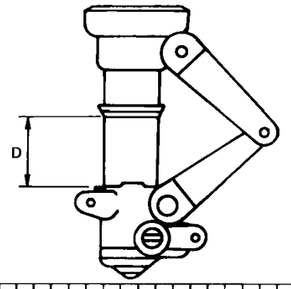
(2)Replenishing (Ref. Fig. 012)
(a)Preparation of replenishing system
1 Assemble the replenishing system using items taken from air/hydraulic tool kit.
- Connect suction line (11) to hand pump (12) and hydraulic fluid supply (10) (Material No.02-001 or No.02-004 or No.02-006).
- Connect line (13) to hand pump (12) outlet and to three-way valve (7) (supply port).
- Connect line (5) to three-way valve (7) (delivery port) and to adaptor (4).
- Connect line (8) to three-way valve (7) (bleed port) and to drain pan (9).
- Install pressure gage (6) (from 0 to 100 bars) (0 to 1450 psi).

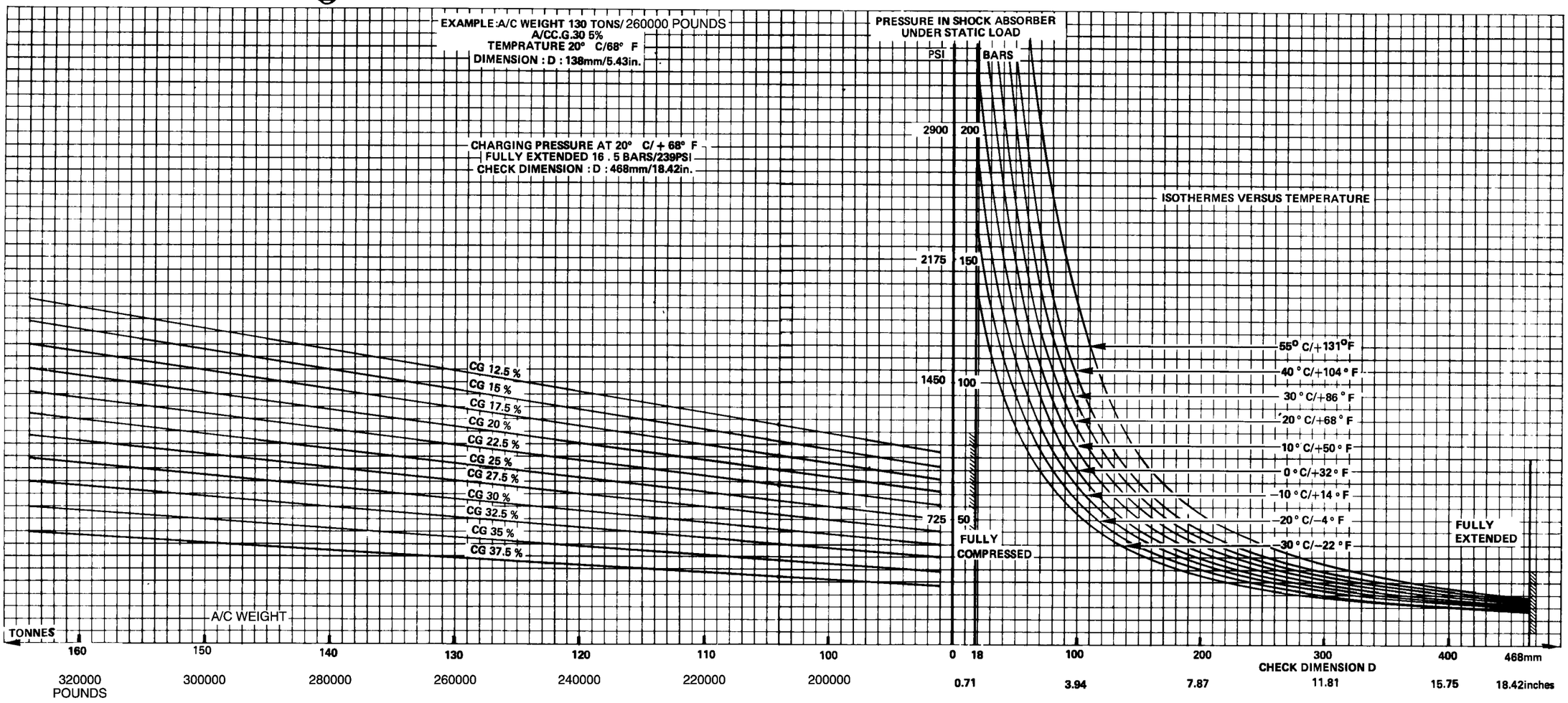
2 Bleed the system by operating hand pump (12) slowly and by opening the two valves A and B of three-way valve (7). Then close valves A and B.
3 Remove protective cap (3) from valve (1) ; connect the system by screwing adaptor (4) on valve (1). Hand tighten the adaptor knurled nut.
(b)Depressurization of shock absorber
1 Cut lockwire and unscrew valve (1) control nut (2) by one and a half turns.
2 Gradually open valve B of three-way valve (7) and let the shock absorber compress slowly until it bottoms.
WARNING : DURING THIS OPERATION, TAKE ALL NECESSARY PRECAUTIONS TO AVOID ANY ACCIDENT.
3 When pressure is fully released, close valve B.
4 Before starting topping-up, drain the fluid which may have accumulated, by loosening the leak detector needle valve located at lower spherical bearing at the bottom of the landing gear leg.
Tighten needle valve when flow stops.
(c)Fluid topping-up
1 Open valve A of three-way valve (7) and operate hand pump (12).
2 Stop operating the hand pump when the shock absorber is extended by approximately 50 mm (1.968 in.) and close valve A.
3 Slightly open valve B and allow the shock absorber to compress slowly until it reaches end-of-travel.
NOTE: Check that the surplus fluid discharged through bleed line (8) shows no sign of emulsion.
Repeat topping up operations as necessary, until the fluid discharged is free from air bubbles.
4 Close valve B when shock absorber reaches end-of-travel and the flow stops.
(d)Charge shock absorber
(3)Charging of shock absorber

(Ref. Fig. 012)
(Ref. Fig. 013)
(a)Preparation of charging system
1 Assemble charging system using items taken from air/hydraulic tool kit.
- Connect line (15) to nitrogen supply (14) incorporating pressure regulator and three-way valve (7) (supply port).



Nose Gear Shock Absorber - Replenishing and Charging
Figure 012





Nose Gear Shock Absorber - Charging Chart
Figure 013

R

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- Connect line (8) to three-way valve (7) (bleed port) and drain pan (9).
- Connect line (5) to three-way valve (7) (delivery port) and adaptor (4).
- Install pressure gage (6).

2 Open three-way valve (7) valves A and B and apply nitrogen pressure so as to bleed system

3 Close valve B. Remove charging valve (1) protective cap (3) and connect adaptor (4).

(b) Cut lockwire and unscrew charging valve (1) control nut (2) by one and a half turns.

(c) Gradually increase nitrogen pressure using the pressure regulator and let the shock absorber extend slowly. When the shock absorber reaches dimension "D" determined as a function of load, close valve A on three-way valve (7).

(d) Close charging valve (1) control nut (2). TORQUE to between 0.5 and 0.8 m.daN (44.235 and 70.776 lbf. in.).

(e) Shut off nitrogen supply. On pressure regulator reduce pressure to zero.

(f) Open valve B on three-way valve so that regulated pressure drops to zero.

(g) Disconnect and remove charging system.

(h) Install protective cap (3) on charging valve (1).

(j) Remove leak detector needle valve and make certain that sealing is effective. Install needle valve.

(k) Do an inspection/check of nose gear shock absorber (Ref. 32-21-14, P. Block 601).

(4) Close-up

WARNING : MAKE CERTAIN THAT DOOR TRAVEL RANGES ARE CLEAR.

(a) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b) Close nose gear doors (Ref. 32-22-11, P. Block 301).

(c) Remove warning notices.

(d) Close access doors, remove access platforms and safety barriers.

(e) Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

OIL

1. General

This section provides information on refilling and oil replenishing of the engine and the accessories such as the **INTEGRATED DRIVE GENERATION,** the pneumatic starter etc...

The oil filling or topping up is classified by **ATA** Chapters.

Examples :

12-13-24 Electrical Power
12-13-27 Flight Controls
12-13-49 APU
12-13-79 Engines
12-13-80 Starting System

CAUTION : **TAKE THE NECESSARY SAFETY PRECAUTIONS AGAINST DERMATITIS.**

1. Drainage of Engine 1 and 2 IDG'S

R A. Equipment and Materials

ITEM	DESIGNATION
(1)	Container 1.5 US Gallon (5.68 liters)
(2)	O-Ring
(3)	Oil
(4)	Acryloid
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 24-11-00, P. Block 301	IDG System
- 12-32-24, P. Block 301	Sampling of the IDG Oil for Analysis

R B. Procedure

(1)Job set-up

WARNING : WHEN CONNECTING THE OVERFLOW DRAIN HOSE TO THE OVERFLOW DRAIN VALVE, DIRECT THE DRAIN HOSE INTO A SUITABLE CONTAINER TO AVOID SPRAYING HOT OIL. HOT OIL MAY CAUSE BURNS TO EYES AND SKIN. WEAR SPLASH GOGGLES, INSULATED GLOVES, AND OTHER PROTECTIVE GEAR. IN CASE OF EYE OR SKIN CONTACT, GET MEDICAL ATTENTION IMMEDIATELY.

CAUTION : ALLOW IDG TO COOL BEFORE VENTING OR ATTACHING DRAIN LINE. IF IDG IS NOT COOL, OIL WILL BE HOT AND UNDER PRESSURE.

(Ref. Fig. 001)

(a)On engine, open left fan and left thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(b)Depressurize IDG by connecting drain line to overflow drain valve or depressurize IDG by pressing the "PUSH TO VENT valve" (if still installed) for approximately 15 seconds.

(2)Drainage

WARNING : WEAR GOGGLES WHEN REMOVING LOCKWIRE.

(a)Cut and remove lockwire and remove case drain plug and O-ring.

(b)Drain oil into suitable container. Periodically press vent valve (if installed) while draining.

R NOTE : - If the drained oil has a fuel odour, do the servicing
R of the IDG after oil chemical contamination
R (Ref. 24-11-00, P. Block 301).
R - If you think that the condition of the drained oil is not
R correct, do a sampling of the IDG oil for analysis
R (Ref. 12-32-24, P. Block 301).

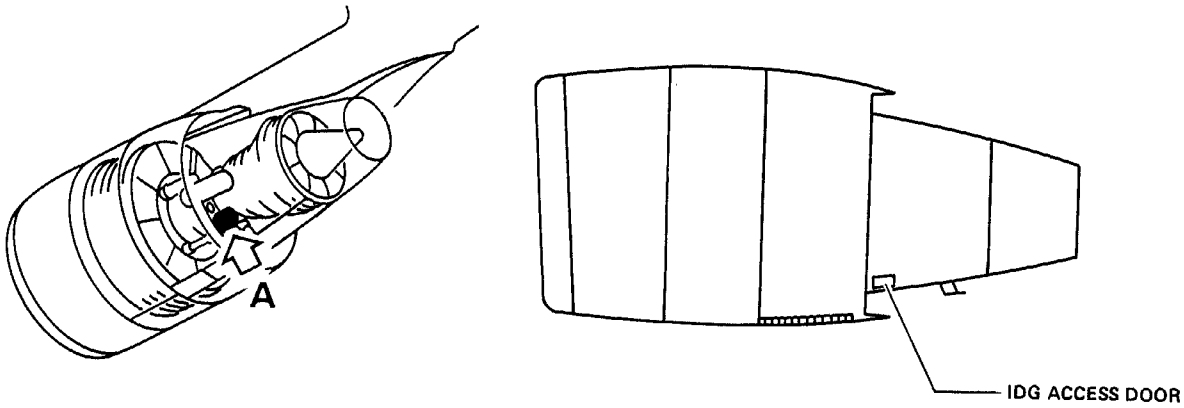
(3)Close-up

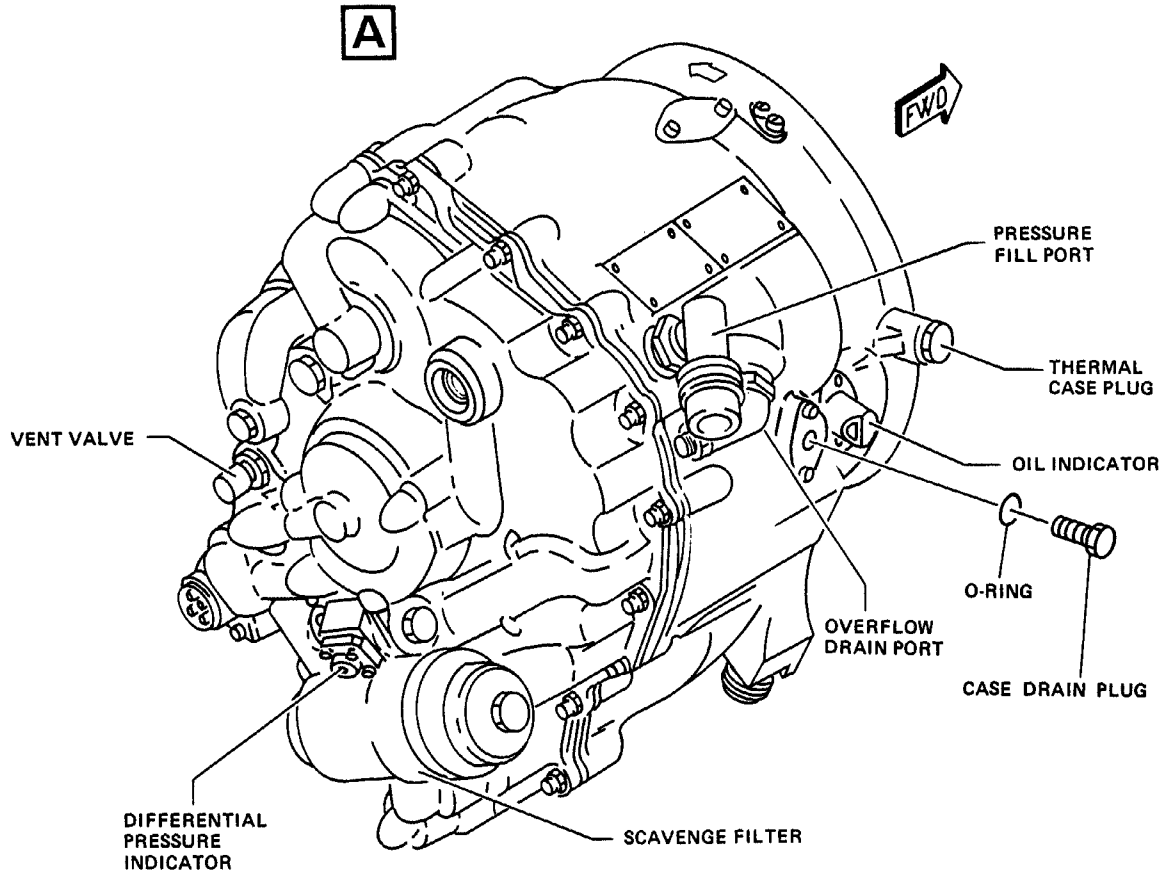
(a)After drainage, install new O-ring lubricated with Acryloid or oil on drain plug.

(b)Install case drain plug in IDG case and TORQUE to between 55 lbf.in. and 75 lbf.in. (0.56 m.daN and 0.85 m.daN).

(c)Safety case drain plug with lockwire.

(d)Remove overflow drain line from the overflow drain valve if





NOTE: IDG IS ROTATED TO SHOW BOTTOM VIEW

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IDG Servicing
Figure 001

installed. Install case overflow plug.

(e)On engine, close left fan and left thrust reverser cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.

2. Normal or Initial Replenishing of the IDG

CAUTION : OPERATING THE IDG WITHOUT ENOUGH OIL OR OVERFILLED WILL CAUSE OVERHEATING AND SEVERE INTERNAL DAMAGE.

CAUTION : SERVICING THE IDG WITHOUT THE PROPER DRAIN LINE CONNECTED TO THE OVERFLOW DRAIN VALVE WILL RESULT IN OVERFILLING AND SUBSEQUENT DAMAGE TO THE IDG.

A. Reason for the Job

R (1)Replenishing of the IDG with oil is achieved under pressure. This operation is performed after replacement of the IDG or after replacement of components (filter, oil cooler, and/or oil lines) or after inspection/check (contamination, oil heating) (Ref. 24-11-00, P. Block 301) or during scheduled servicing.

B. Equipment and Materials

ITEM	DESIGNATION
R (1)	Container 0.5 US Gallons (1.9 liters)
(2)Material No. 03-002	Oils (Ref. 20-31-00)
R or	
R Material No. 03-003	Oils (Ref. 20-31-00)
(3)98A12001017000	Tank - Engine Oil Filling Up (Portable Type)
or	
DH13PM	Tank - Engine Oil Filling Up (Portable Type)
Referenced Procedure	
- 06-41-54, P. Block 1	Nacelles and Pylons

C. Procedure

(Ref. Fig. 002)

(1)Job set-up

WARNING : HOT OIL MAY CAUSE BURNS TO EYES AND SKIN. WEAR SPLASH GOGGLES, INSULATED GLOVES, AND OTHER PROTECTIVE GEAR IN CASE OF EYE OR SKIN CONTACT, GET MEDICAL ATTENTION IMMEDIATELY.

(a)On left thrust reverser cowl door, open access door 451EL (461EL) (Ref. 06-41-54, P. Block 1).

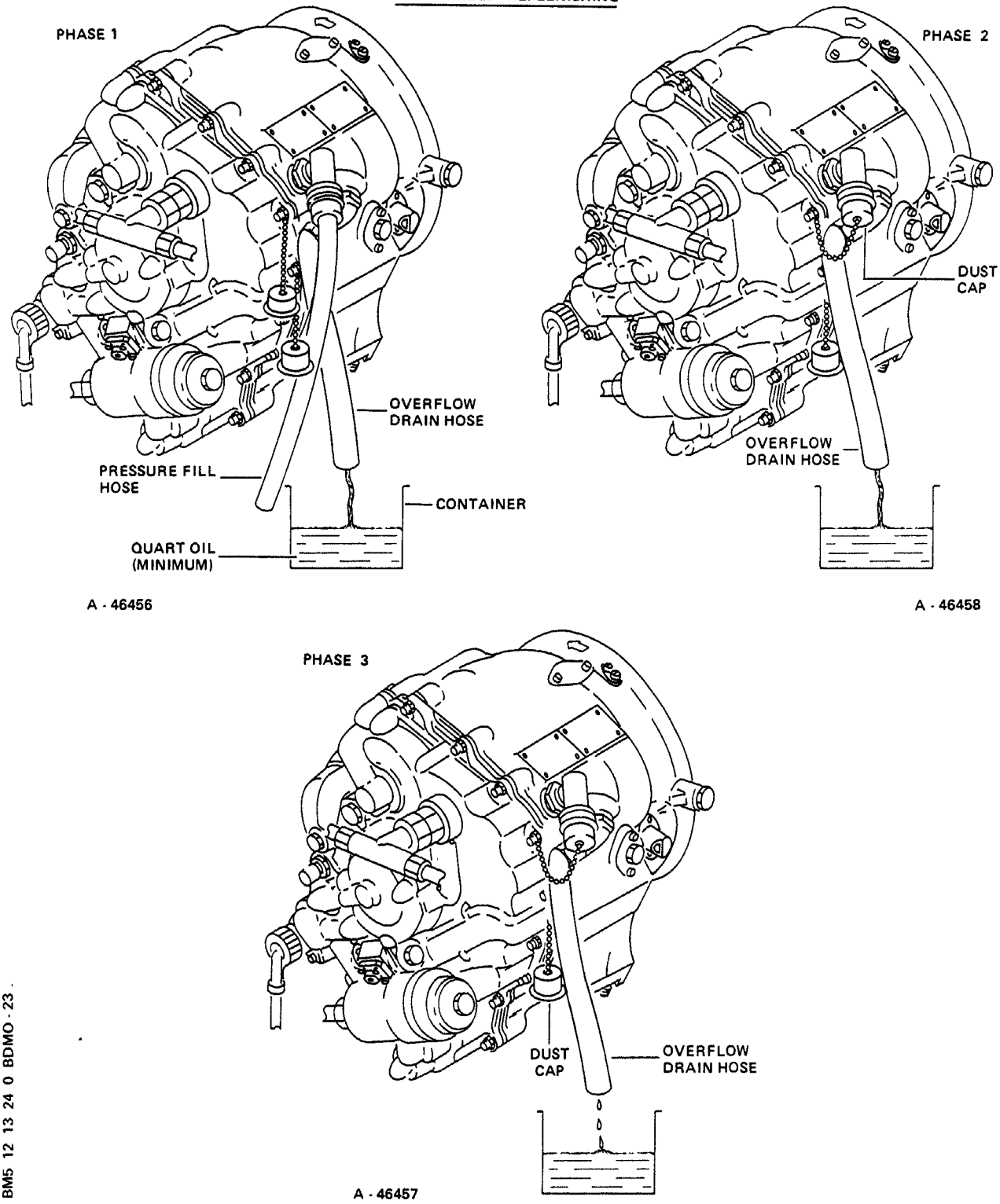
(b)Remove dust caps from the overflow drain and pressure fill valves.

WARNING : WHEN CONNECTING THE OVERFLOW DRAIN HOSE TO THE OVERFLOW DRAIN VALVE, DIRECT THE DRAIN HOSE INTO A SUITABLE CONTAINER TO PREVENT SPRAYING HOT OIL. HOT OIL MAY CAUSE BURNS TO EYES AND SKIN.

(c)Connnect the overflow drain hose to the overflow drain valve. Some oil may come out the drain hose when it is connected (standpipe volume).

(d)Connect the pressure fill hose to the pressure fill valve.

(2)Replenishing



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Summarized Replenishing Procedure
Figure 002

CAUTION : DO NOT MIX TYPES OR BRANDS OF OIL.

R NOTE : An internal oil consumption of 1 cc is permitted or each flight
R hour or when the engines operate.

R (a)Pump oil into IDG until the color of oil flowing from the overflow
R drain hose matches the color of the oil being pumped into the IDG or
R until at least 0.26 gallons (1 liter) of oil are collected from the
R overflow drain hose.

R (b)Remove the pressure fill hose from the pressure fill valve.

R (c)Install the dust cap securely on the pressure fill valve.

R (d)When oil drainage from the overflow drain hose slows to drops, remove the drain hose.

R (e)Install the dust cap securely on the overflow drain valve.

(3)Close-up

(a)On left thrust reverser cowl door, close access door 415EL (461EL) (Ref. 06-41-54, P. Block 1).

3. Unscheduled Alternate Oil Servicing

A. Reason for the Job

As time and temperature constraints are no more required, the new normal servicing procedure is applicable for short turn-around and should be performed as follows.

B. Procedure

(1)If IDG has not been disconnected, top-up IDG according to "normal servicing of the IDG", Ref. para. 2.).

(2)If IDG has been disconnected proceed as follows :

(a)Drain IDG according to IDG servicing/drainage, (Ref. para. 1).

(b)Replenish IDG according to "normal servicing of the IDG", (Ref. para. 2.).

1. Drainage of Engine 1 and 2 IDG'S

R A. Equipment and Materials

ITEM	DESIGNATION
(1)	Container 1.5 US Gallon (5.68 liters)
(2)	O-Ring
(3)	Oil
(4)	Acryloid
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 24-11-00, P. Block 301	IDG System
- 12-32-24, P. Block 301	Sampling of the IDG Oil for Analysis

R B. Procedure

(1)Job set-up

WARNING : WHEN CONNECTING THE OVERFLOW DRAIN HOSE TO THE OVERFLOW DRAIN VALVE, DIRECT THE DRAIN HOSE INTO A SUITABLE CONTAINER TO AVOID SPRAYING HOT OIL. HOT OIL MAY CAUSE BURNS TO EYES AND SKIN. WEAR SPLASH GOGGLES, INSULATED GLOVES, AND OTHER PROTECTIVE GEAR. IN CASE OF EYE OR SKIN CONTACT, GET MEDICAL ATTENTION IMMEDIATELY.

CAUTION : ALLOW IDG TO COOL BEFORE VENTING OR ATTACHING DRAIN LINE. IF IDG IS NOT COOL, OIL WILL BE HOT AND UNDER PRESSURE.

(Ref. Fig. 001)

(a)On engine, open left fan and left thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(b)Depressurize IDG by connecting drain line to overflow drain valve or depressurize IDG by pressing the "PUSH TO VENT valve" (if still installed) for approximately 15 seconds.

(2)Drainage

WARNING : WEAR GOGGLES WHEN REMOVING LOCKWIRE.

(a)Cut and remove lockwire and remove case drain plug and O-ring.

(b)Drain oil into suitable container. Periodically press vent valve (if installed) while draining.

NOTE : - If the drained oil has a fuel odour, do the servicing of the IDG after oil chemical contamination (Ref. 24-11-00, P. Block 301).
- If you think that the condition of the drained oil is not correct, do a sampling of the IDG oil for analysis (Ref. 12-32-24, P. Block 301).

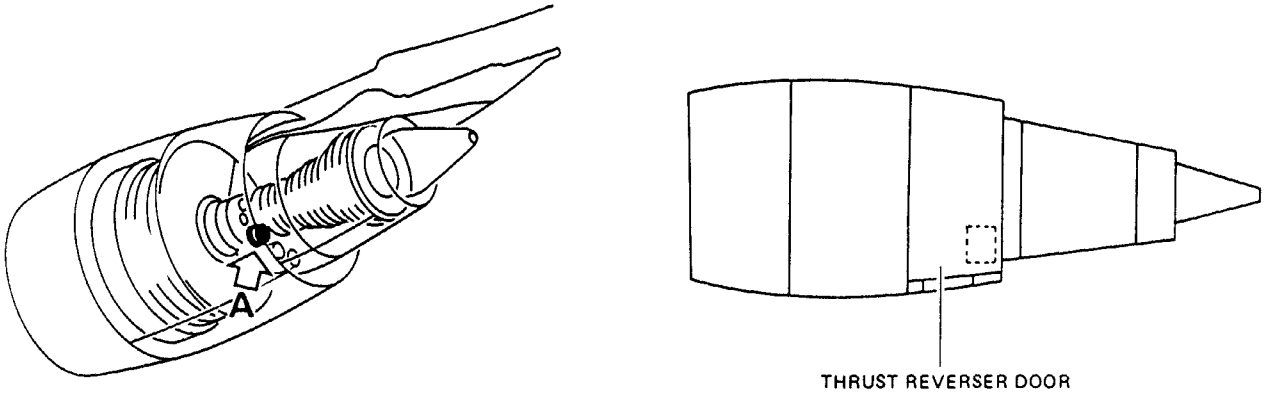
(3)Close-up

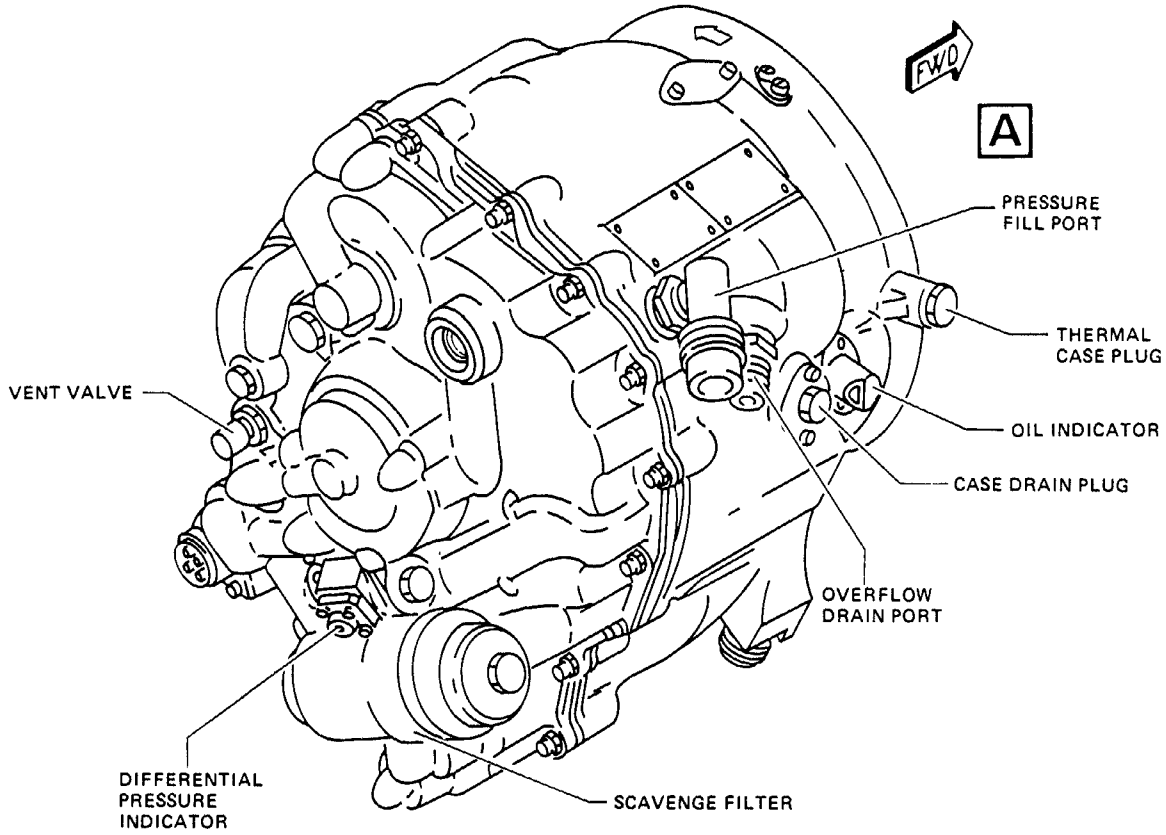
(a)After drainage, install new O-ring lubricated with Acryloid or oil on drain plug.

(b)Install case drain plug in IDG case and TORQUE to between 55 lbf.in. and 75 lbf.in. (0.56 m.daN and 0.85 m.daN).

(c)Safety case drain plug with lockwire.

(d)Remove overflow drain line from the overflow drain valve if





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NOTE: IDG IS ROTATED TO SHOW BOTTOM VIEW

IDG Servicing
Figure 001

installed. Install case overflow plug.

(e)On engine, close left fan and left thrust reverser cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.

2. Normal or Initial Replenishing of the IDG

CAUTION : OPERATING THE IDG WITHOUT ENOUGH OIL OR OVERFILLED WILL CAUSE OVERHEATING AND SEVERE INTERNAL DAMAGE.

CAUTION : SERVICING THE IDG WITHOUT THE PROPER DRAIN LINE CONNECTED TO THE OVERFLOW DRAIN VALVE WILL RESULT IN OVERFILLING AND SUBSEQUENT DAMAGE TO THE IDG.

A. Reason for the Job

(1)Replenishing of the IDG with oil is achieved under pressure. This operation is performed after replacement of the IDG or after replacement of components (filter, oil cooler, and/or oil lines) or after inspection/check (contamination, oil heating) (Ref. 24-11-00, P. Block 301) or during scheduled servicing.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Container 0.5 US Gallons (1.9 liters)
(2)Material No. 03-002	Oils (Ref. 20-31-00)
or	
Material No. 03-003	Oils (Ref. 20-31-00)
(3)98A12001017000	Tank - Engine Oil Filling Up (Portable Type)
or	
DH13PM	Tank - Engine Oil Filling Up (Portable Type)
Referenced Procedure	
- 06-41-54, P. Block 1	Nacelles and Pylons

C. Procedure

(Ref. Fig. 002)

(1)Job set-up

WARNING : HOT OIL MAY CAUSE BURNS TO EYES AND SKIN. WEAR SPLASH GOGGLES, INSULATED GLOVES, AND OTHER PROTECTIVE GEAR IN CASE OF EYE OR SKIN CONTACT, GET MEDICAL ATTENTION IMMEDIATELY.

(a)On left thrust reverser cowl door, open access door 451EL (461EL) (Ref. 06-41-54, P. Block 1).

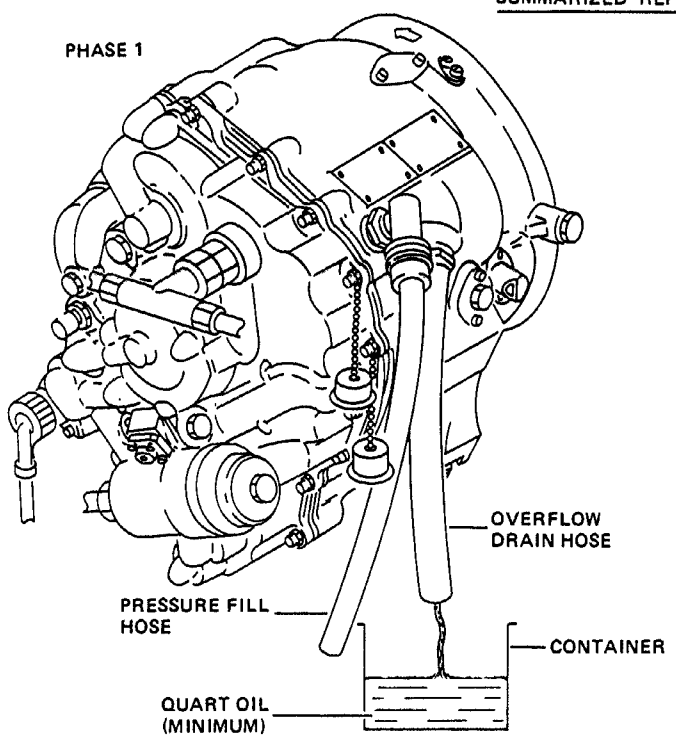
(b)Remove dust caps from the overflow drain and pressure fill valves.

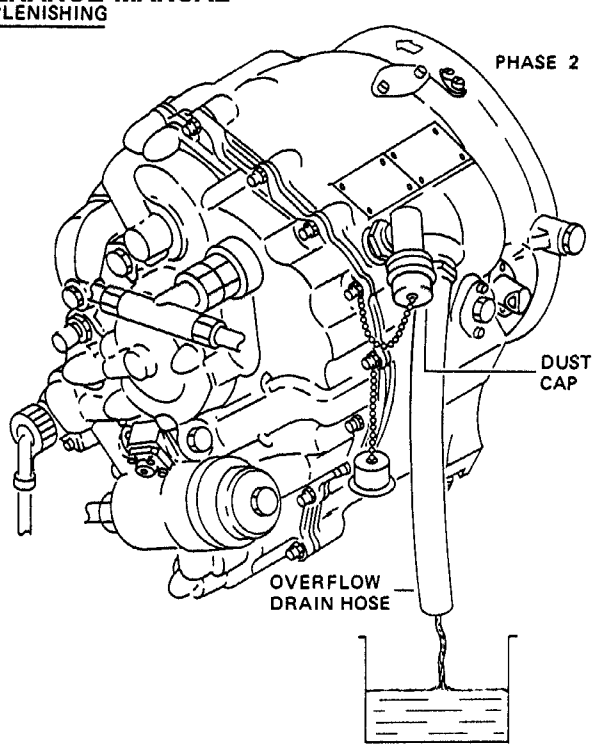
WARNING : WHEN CONNECTING THE OVERFLOW DRAIN HOSE TO THE OVERFLOW DRAIN VALVE, DIRECT THE DRAIN HOSE INTO A SUITABLE CONTAINER TO PREVENT SPRAYING HOT OIL. HOT OIL MAY CAUSE BURNS TO EYES AND SKIN.

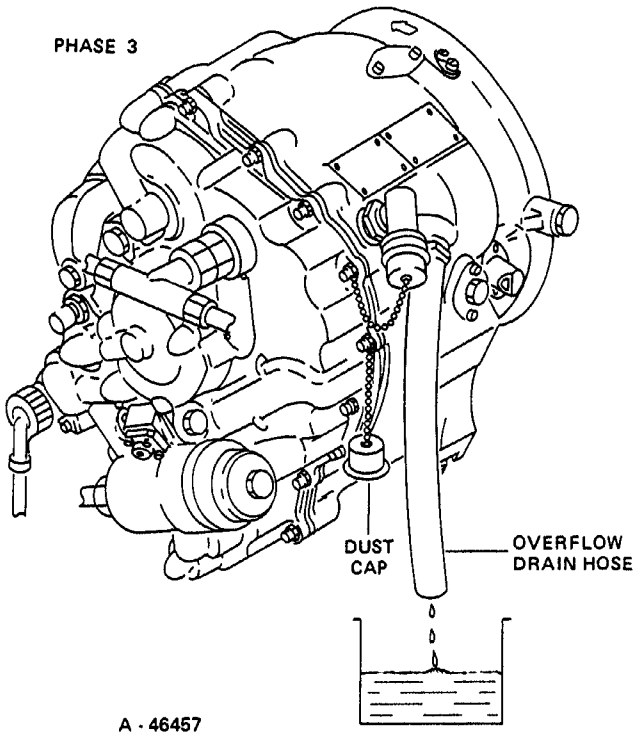
(c)Connnect the overflow drain hose to the overflow drain valve. Some oil may come out the drain hose when it is connected (standpipe volume).

(d)Connect the pressure fill hose to the pressure fill valve.

(2)Replenishing







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Summarized Replenishing Procedure
Figure 002

CAUTION : DO NOT MIX TYPES OR BRANDS OF OIL.

NOTE : An internal oil consumption of 1 cc is permitted or each flight hour or when the engines operate.

(a)Pump oil into IDG until the color of oil flowing from the overflow drain hose matches the color of the oil being pumped into the IDG or until at least 0.26 gallons (1 liter) of oil are collected from the overflow drain hose.

(b)Remove the pressure fill hose from the pressure fill valve.

(c)Install the dust cap securely on the pressure fill valve.

(d)When oil drainage from the overflow drain hose slows to drops, remove the drain hose.

(e)Install the dust cap securely on the overflow drain valve.

(3)Close-up

(a)On left thrust reverser cowl door, close access door 415EL (461EL) (Ref. 06-41-54, P. Block 1).

3. Unscheduled Alternate Oil Servicing

A. Reason for the Job

As time and temperature constraints are no more required, the new normal servicing procedure is applicable for short turn-around and should be performed as follows.

B. Procedure

(1)If IDG has not been disconnected, top-up IDG according to "normal servicing of the IDG", Ref. para. 2.).

(2)If IDG has been disconnected proceed as follows :

(a)Drain IDG according to IDG servicing/drainage, (Ref. para. 1).

(b)Replenish IDG according to "normal servicing of the IDG", (Ref. para. 2.).

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENTS, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : MIXING OF PHOSPHATE ESTER TYPE HYDRAULIC FLUID WITH MINERAL BASED FLUID IS PROHIBITED. SUCH A MIXTURE PRODUCES A JELLY IN HYDRAULIC SYSTEMS AND AIRCRAFT SAFETY MAY BE ADVERSELY AFFECTED.

1. General

This section covers lubricant level check and/or replenishing of the following components:

- trimmable horizontal stabilizer (THS) actuator
- the flap and slat power control units (PCUs)
- the flap and slat screwjacks
- the various gearboxes in the flap and slat transmission systems.

A. Component Lubricant Capacities

(1)Recommendations

(a)Examine components visually for obvious signs of oil leakage.

(b)All oil capacity checks should be conducted with each unit in the specified attitude.

NOTE : It is essential that units are air vented during replenishing. On units with a combined filler/level plug it is necessary to open the alternate (upper) drain plug to provide adequate ventilation.

R (c)Whenever a unit, THS-Actuator excepted, is detected out of oil or
R that it needs more than the max oil quantity allowed for top-up,
R replace it before 20 further flights of the aircraft.
R (d)Whenever a THS-Actuator is detected out of oil or that it needs more
R than the max oil quantity allowed for top-up, perform AMM "chip
R detection" before next flight. If metallic particles exceed the size
R criteria, replace the unit before next flight. If not, replace it
R before 20 further flights of the aircraft.

	UNIT	FIN	Max Allowable Top-Up Quantity (ccm)	Min Required Drainable Quantity (ccm)	Normal Operating = in-situ Replenishing Quantity (ccm)
R	Flap Power Control Unit	5469	520	780	1300
R	THS Actuator	4955	860	4000	4860
R	Flap Torque Limiter (LH)	5471	80	110	190
R	Flap Torque Limiter (RH)	5514	80	110	190
R	Forward Right Angle Gearbox	5476	35	55	90
R	Forward Right Angle Gearbox	5519	35	55	90
R	Aft Right Angle Gearbox	5473	35	55	90
R	Aft Right Angle Gearbox	5516	35	55	90
R	Flap Screwjack No.1(LH)	5477	175	275	450
R	Flap Screwjack No.1(RH)	5520	175	275	450
R	Flap Screwjack No.2 (Upper)	5484	115	210	325
R	Flap Screwjack No.2 (Lower)	5484	255	375	630
R	Flap Screwjack No.2 (Upper)	5527	115	210	325
R	Flap Screwjack No.2 (Lower)	5527	255	375	630
R	Flap Screwjack No.3 (Upper)	5492	115	210	325
R	Flap Screwjack No.3 (Lower)	5492	255	375	630
R	Flap Screwjack No.3	5535	115	210	325

UNIT	FIN	Max Allowable Top-Up Quantity (ccm)	Min Required Drainable Quantity (ccm)	Normal Operating = in-situ Replenishing Quantity (ccm)
(Upper)				
Flap Screwjack No.3 (Lower)	5535	255	375	630
Flap Screwjack No.4 (Upper)	5502	115	210	325
Flap Screwjack No.4 (Lower)	5502	255	375	630
Flap Screwjack No.4 (Upper)	5545	115	210	325
Flap Screwjack No.4 (Lower)	5545	255	375	630
Slat Power Control Unit	5264	520	490	1010
Slat T-Gearbox (Upper)	5270	26	35	61
Slat T-Gearbox (Lower)	5270	17	25	42
Slat Torque Limiter(LH)	5272	50	70	120
Slat Torque Limiter(RH)	5420	50	70	120
Slat Wing Root Gearbox (LH)	5274	30	70	100
Slat Wing Root Gearbox (RH)	5422	30	70	100
Slat Line Gearbox (LH)	5278	35	35	70
Slat Line Gearbox (LH)	5286	35	35	70
Slat Line Gearbox (RH)	5426	35	35	70
Slat Line Gearbox (RH)	5434	35	35	70
Slat Screwjack No.1(LH)	5276	80	60	140

UNIT	FIN	Max Allowable Top-Up Quantity (ccm)	Min Required Drainable Quantity (ccm)	Normal Operating = in-situ Replenishing Quantity (ccm)
Slat Screwjack No.2(LH)	5280	80	60	140
Slat Screwjack No.3(LH)	5288	80	60	140
Slat Screwjack No.4(LH)	5344	80	60	140
Slat Screwjack No.1(RH)	5424	80	60	140
Slat Screwjack No.2(RH)	5428	80	60	140
Slat Screwjack No.3(RH)	5436	80	60	140
Slat Screwjack No.4(RH)	5442	80	60	140
Slat Screwjack No.5(LH)	5400	80	60	140
Slat Screwjack No.5(RH)	5450	80	60	140
Slat Screwjack No.6(LH)	5408	80	60	140
Slat Screwjack No.6(RH)	5458	80	60	140

NOTE : Due to units being in a different attitude when filled up prior to installation, a quantity of fluid may escape when the filler plug is removed.

NOTE : Variations of individual castings, ambient temperatures, A/C attitude, etc. may cause slight variations in quantities, therefore a general tolerance of +/- 10 cc can be applied to the values given in the table (Normal Operating in-situ).

2. Trimmable Horizontal Stabilizer Actuator

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 5.5 m (18 ft.)
(2)98A53207606000	Panels - Floor Fuselage Tail Section
(3)0U190363	Tool - Oil Filling, THS Actuator
(4)0U190364	Tool - Oil Draining, THS Actuator
(5)	Container
(6)	Circuit Breaker Safety Clips and Tags
(7)Material No. 03-003	Oils (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-44-11, P. Block 601	THS Actuator
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

B. Procedure

CAUTION : BEFORE THE PROCEDURE IS CARRIED OUT, OBEY THE RECOMMENDATIONS GIVEN IN PARAGRAPH 1. GENERAL.

(Ref. Fig. 001)

(1)Job Set-Up

(a)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

(c)Pressurize GREEN and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).

WARNING : BEFORE OPERATING HORIZONTAL STABILIZER MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACE IS CLEAR.

(d)Operate horizontal stabilizer over complete range in both directions and set to 0° position, $+1^{\circ}$, -1°.

(e)Depressurize the GREEN and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).

(f)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(g)Position access platform.

(h)Open access door 312AR.

(i)Install fuselage tail section floor panels PN 98A53207606000.

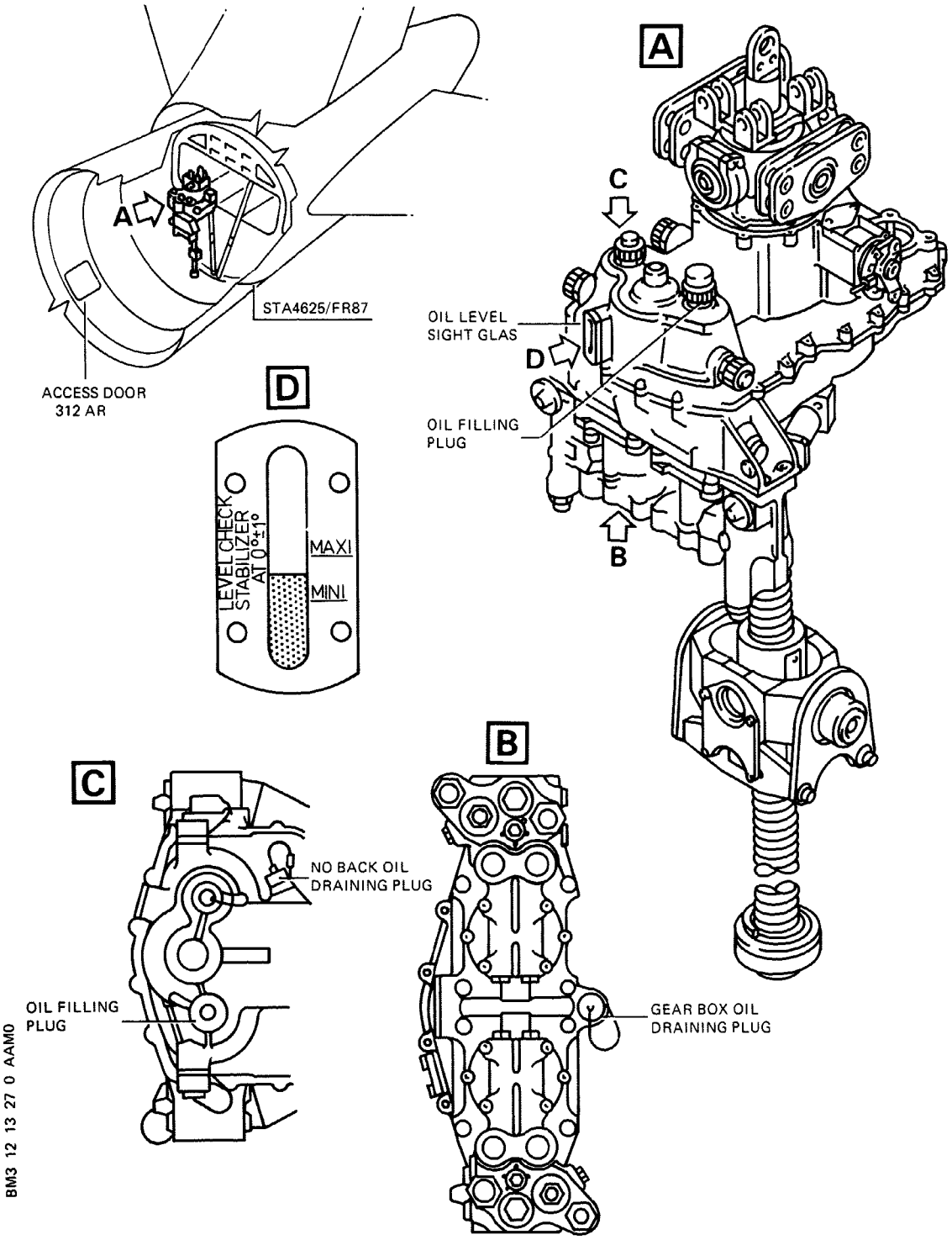
(j)Position container under THS actuator to collect any spillage.

(2)Filling

(a)Check through sight glass that oil level is at mid-point between MAXI and MINI marks.

(b)If required top-up actuator as follows:

1 Remove breather cap from oil filler plug.



Trimmable Horizontal Stabilizer Actuator
Figure 001

2 Connect oil filling tool PN 0U190363.
3 Fill the THS actuator.
a Record the quantity of oil used to fill the THS actuator to the required level.
b Fill actuator housing with oil (Material No. 03-003) until oil level reaches mid-point between MAXI and MINI marks on sight glass.
c Use the quantity of oil used to determine if the THS actuator has been operating below the minimum oil level.
4 Remove oil filling tool and install breather cap on oil filler plug.
5 Wipe off any spilt fluid.

(3)If it is necessary to drain the unit, proceed as follows:
(4)Draining
(a)Remove protective caps complete with chip detectors from actuator gearbox oil draining plug and from no-back oil draining plug.
(b)Inspect chip detector probes for metal particles (Ref. 27-44-11, P. Block 601).
(c)Using draining tool PN 0U190364, drain oil from gearbox and no-back housings, draining the no-back housing first.
(d)Remove draining tool, clean and install protective caps complete with chip detectors.
(e)Remove breather cap from oil filler plug.
(f)Install oil filling tool PN 0U 190363.
(g)Fill actuator housing with oil until level reaches mid-point between MAXI and MINI marks on sight glass.
(h)Remove oil filling tool and install breather cap on oil filler plug.
(i)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(j)Make certain that electronics racks ventilation is correct.
(k)Pressurize the GREEN and YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).

WARNING : BEFORE OPERATING HORIZONTAL STABILIZER, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACE IS CLEAR.

(l)Operate horizontal stabilizer over full range in both directions and set to 0° position, +1°, -1°.
(m)Depressurize GREEN and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(n)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(o)Check oil level in actuator sight glass, if oil level is below the mid-point between MAXI and MINI marks repeat steps (3)(e) thru (3)(o).
(p)Wipe off any spilt fluid.
(5)Close-Up
(a)Remove container from below actuator.
(b)Remove tail section floor panels PN 98A53207606000.
(c)Close access door 312AR.
(d)Remove access platform.

3. Flap Power Control Unit

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.5 m (8 ft. 4 in.)
(2)	Torque Wrench, 2.0 to 3.74 m.daN (14.8 to 27.5 lbf.ft.)
(3)	Seals
(4)	Container
(5)	Suitable Squeeze Bottle
(6)	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
(7)Material No. 03-003	Oils (Ref. 20-31-00)
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure

CAUTION : BEFORE THE PROCEDURE IS CARRIED OUT, OBEY THE RECOMMENDATIONS GIVEN IN PARAGRAPH 1. GENERAL.

(Ref. Fig. 002)

(1)Job-Set Up

NOTE : The flaps may be in any position during filling procedure.

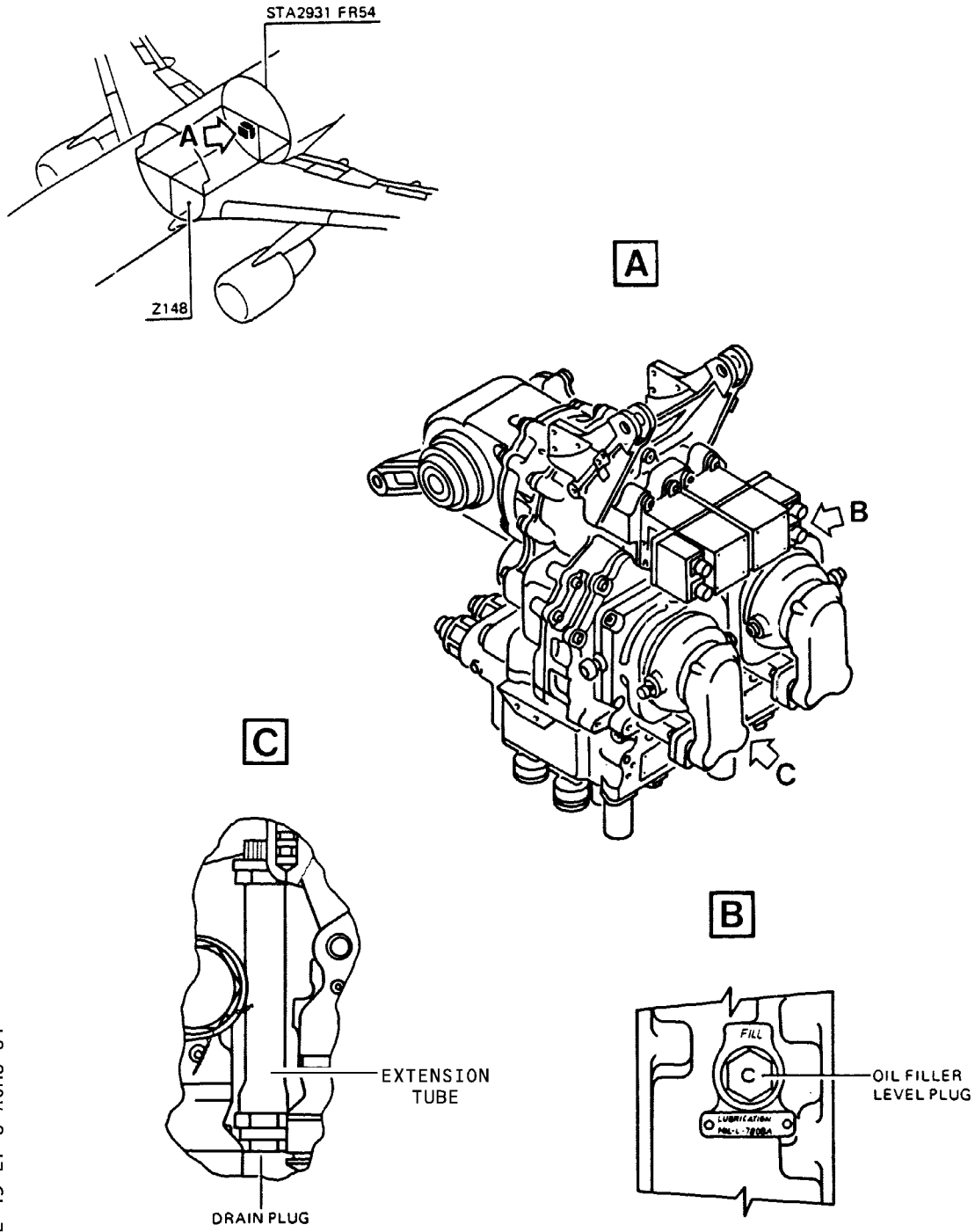
(a)Open one of the main landing gear doors (Ref. 32-12-11, P. Block 301).
(b)Position access platform.

(2)Oil level check
(a)Remove oil filler/level plug and discard seal.
(b)If the oil level is lower than the base of the filler plug opening, fill the PCU
1 Record the quantity of oil used to fill the PCU to the required level.
2 Use a suitable squeeze bottle to top-up the PCU with oil Material No. 03-003) until it flows from the base of the filler plug opening.
3 Make sure that the added oil quantity is in accordance with the values given in the table (column 1).
(c)Install new seal on oil filler/level plug.
(d)Install oil filler/level plug.
(e)TORQUE oil filler/level plug to between 3.4 and 3.74 m.daN (25 and 27.5 lb.ft.).

(3)If it is necessary to drain the unit, proceed as follows:

(4)Draining

CAUTION : TO ENSURE THAT THE EXTENSION TUBE IS NOT LOOSENED FROM THE POWER CONTROL UNIT, IT IS RECOMMENDED THAT AN OPPOSING TORQUE IS



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Flap Power Control Unit
Figure 002

APPLIED TO THE TUBE DURING DRAIN PLUG REMOVAL.

(a)Remove oil filler/level plug and discard seal.
(b)Position container below flap power control unit (PCU).
(c)Cut and remove lockwire from drain plug.
(d)Remove drain plug and drain oil into container. Check quantity of drained oil. Discard seal.
(e)Install new seal on drain plug.
(f)Install drain plug.
(g)TORQUE drain plug to between 2.0 and 2.5 m.daN (14.8 and 18.4 lbf.ft.).
(h)Safety drain plug with lockwire.

(5)Filling
(a)Fill PCU with oil (Material No. 03-003) until it flows from the base of the filler plug opening.
(b)Install new seal on oil filler/level plug.
(c)Install oil filler/level plug.
(d)TORQUE oil filler/level plug to between 3.4 and 3.74 m.daN (25 and 27.5 lb.ft.).

(6)Close-Up
(a)Wipe off all traces of oil.
(b)If necessary remove container from below PCU.
(c)Remove access platform.
(d)Close main landing gear door (Ref. 32-12-11, P. Block 301).

4. Flap Torque Limiter

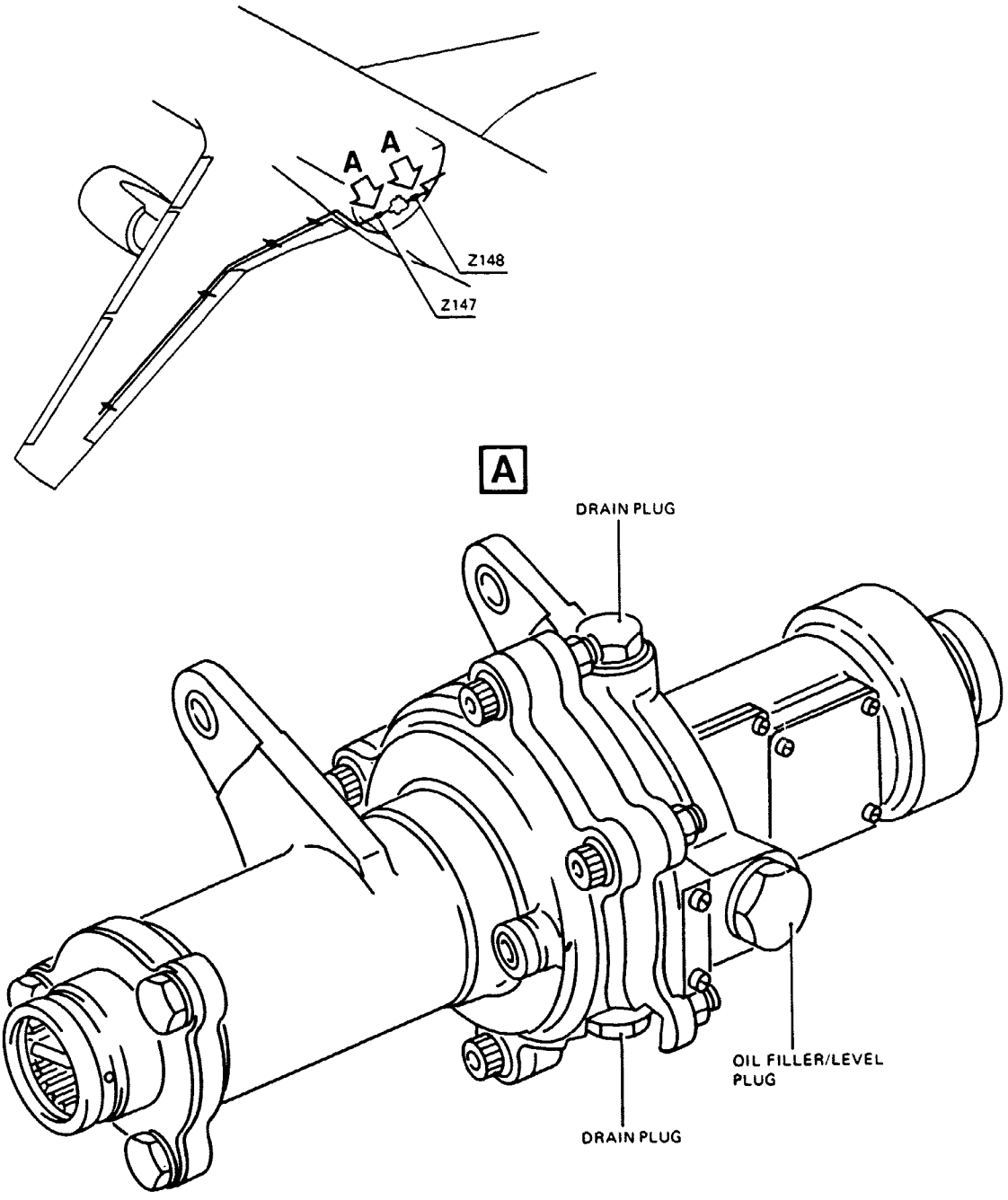
A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.5 m (8 ft. 4 in.)
(2)	Torque Wrench, 1.23 to 1.5 m.daN (9.1 to 11.1 lbf.ft.)
(3)	Seal
(4)	Container
(5)	Suitable Squeeze Bottle
(6)	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
(7)Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedure	
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure

CAUTION : BEFORE THE PROCEDURE IS CARRIED OUT, OBEY THE RECOMMENDATIONS GIVEN IN PARAGRAPH 1. GENERAL.

(Ref. Fig. 003)
(1)Job-Set Up



Flap Torque Limiter
Figure 003

NOTE : The flaps may be in any position during filling procedure.

(a)Open one of the main landing gear doors (Ref. 32-12-11, P. Block 301).
(b)Position access platform.
(2)Oil level check
(a)Remove oil filler/level plug and discard seal.
(b)If the oil level is lower than the base of the filler plug opening, fill the flap torque limiter.
1 Record the quantity of oil used to fill the flap torque limiter to the required level.
2 Use a suitable squeeze bottle to top-up the flap torque limiter with oil (Material No. 02-001) until it flows from the base of the filler plug opening.
3 Make sure that the added oil quantity is in accordance with the values given in the table (column 1).
(c)Install new seal on oil filler/level plug.
(d)Install oil filler/level plug.
(e)TORQUE oil filler/level plug to between 1.23 and 1.5 m.daN (9.1 and 11.1 lbf.ft.).
(3)If it is necessary to drain the unit, proceed as follows:
(4)Draining
(a)Remove oil filler/level plug and discard seal.
(b)Position container below flap torque limiter.
(c)Cut and remove lockwire from drain plug.
(d)Remove drain plug and drain oil into container. Check quantity of drained oil. Discard seal.
(e)Install new seal on drain plug.
(f)Install drain plug.
(g)TORQUE drain plug to between 1.23 and 1.5 m.daN (9.1 and 11.1 lbf.ft.).
(h)Safety drain plug with lockwire.
(5)Filling
(a)Fill housing with oil (Material No. 02-001) until it flows from the base of the filler plug opening.
(b)Install new seal on oil filler/level plug.
(c)Install oil filler/level plug.
(d)TORQUE oil filler/level plug to between 1.23 and 1.5 m.daN (9.1 and 11.1 lbf.ft.).
(6)Close-Up
(a)Wipe off all traces of oil.
(b)If necessary remove container from below flap torque limiter.
(c)Remove access platform.
(d)Close main landing gear door (Ref. 32-12-11, P. Block 301).

5. Right Angle Gearbox

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.5 m (8 ft. 4 in.)
(2)	Torque Wrench, 1.36 m.daN (10 lbf.ft.)
(3)	Seal

ITEM	DESIGNATION
(4)	Container
(5)	Suitable Squeeze Bottle
(6)	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
(7)Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedure - 27-50-00, P. Block 301	Flaps

B. Procedure

CAUTION : BEFORE THE PROCEDURE IS CARRIED OUT, OBEY THE RECOMMENDATIONS GIVEN IN PARAGRAPH 1. GENERAL.

(Ref. Fig. 004)

(1)Job Set-Up
- (a)Extend flaps to '15' deg. position (Ref. 27-50-00, P. Block 301).
- (b)Position access platform.

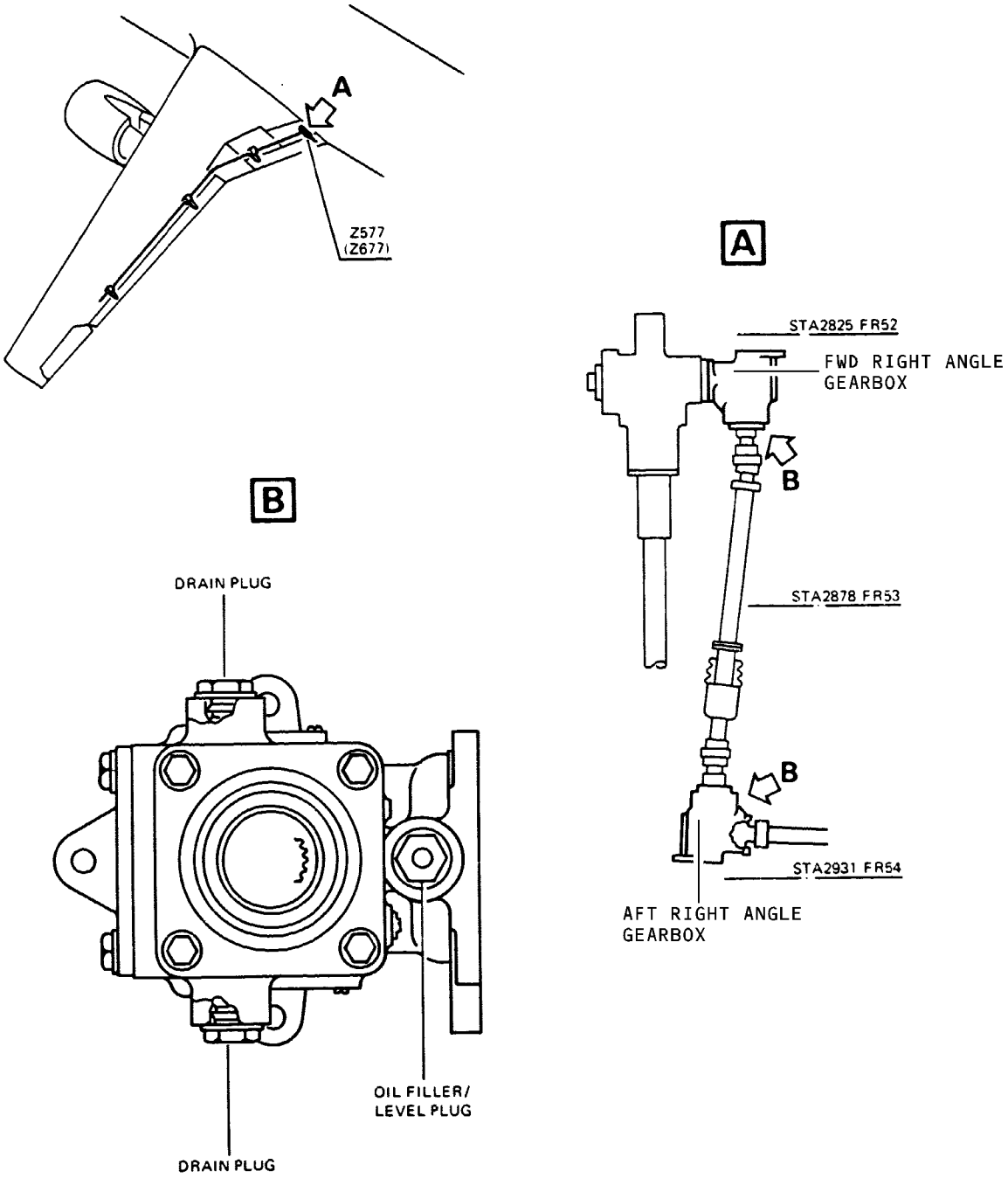
(2)Oil level check
- (a)Remove oil filler/level plug and discard seal.

NOTE : Due to gearbox being in a different attitude when filled up prior to installation, a quantity of oil may escape when the oil filler/level plug is removed.

- (b)If the oil level is lower than the base of the filler plug opening, fill the right angle gearbox.
  1. Record the quantity of oil used to fill the right angle gearbox to the required level.
  2. Use a suitable squeeze bottle to top-up the right angle gearbox with oil (Material No. 02-001) until it flows from the base of the filler plug opening.
  3. Make sure that the added oil quantity is in accordance with the values given in the table (column 1).
- (c)Install new seal on oil filler/level plug.
- (d)Install oil filler/level plug.
- (e)TORQUE oil filler/level plug to 1.36 m.daN (10 lb.ft.).

(3)If it is necessary to drain the unit, proceed as follows:

(4)Draining
- (a)Remove oil filler/level plug and discard seal.
- (b)Position container below right angle gearbox.
- (c)Cut and remove lockwire from lower drain plug.
- (d)Remove drain plug and drain oil into container. Check quantity of drained oil. Discard seal.
- (e)Install new seal on drain plug.
- (f)Install drain plug.
- (g)TORQUE drain plug to 1.36 m.daN (10 lbf.ft.).



Right Angle Gearbox
Figure 004

(h)Safety drain plug with lockwire.

(5)Filling

(a)Fill housing with oil (Material No. 02-001) until it flows from the base of the filler plug opening.

(b)Install new seal on oil filler/level plug.

(c)Install oil filler/level plug.

(d)TORQUE oil filler/level plug to 1.36 m.daN (10 lb.ft.).

(6)Close-Up

(a)Wipe off all traces of oil.

(b)If necessary remove container from below right angle gearbox.

(c)Remove access platform.

(d)Retract flaps to '0' position (Ref. 27-50-00, P. Block 301).

6. Flap Screwjack No. 1

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.5 m (8 ft. 4 in.)
(2)	Torque Wrench, 1.25 to 1.5 m.daN (9 to 11 lbf.ft.)
(3)	Seal
(4)	Container
(5)	Suitable Squeeze Bottle
(6)Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)

Referenced Procedure

- 27-50-00, P. Block 301 — Flaps

B. Procedure

CAUTION : BEFORE THE PROCEDURE IS CARRIED OUT, OBEY THE RECOMMENDATIONS GIVEN IN PARAGRAPH 1. GENERAL.

(Ref. Fig. 005)

(1)Job Set-Up

(a)Extend flaps to '15' deg. position (Ref. 27-50-00, P. Block 301).

(b)Position access platform.

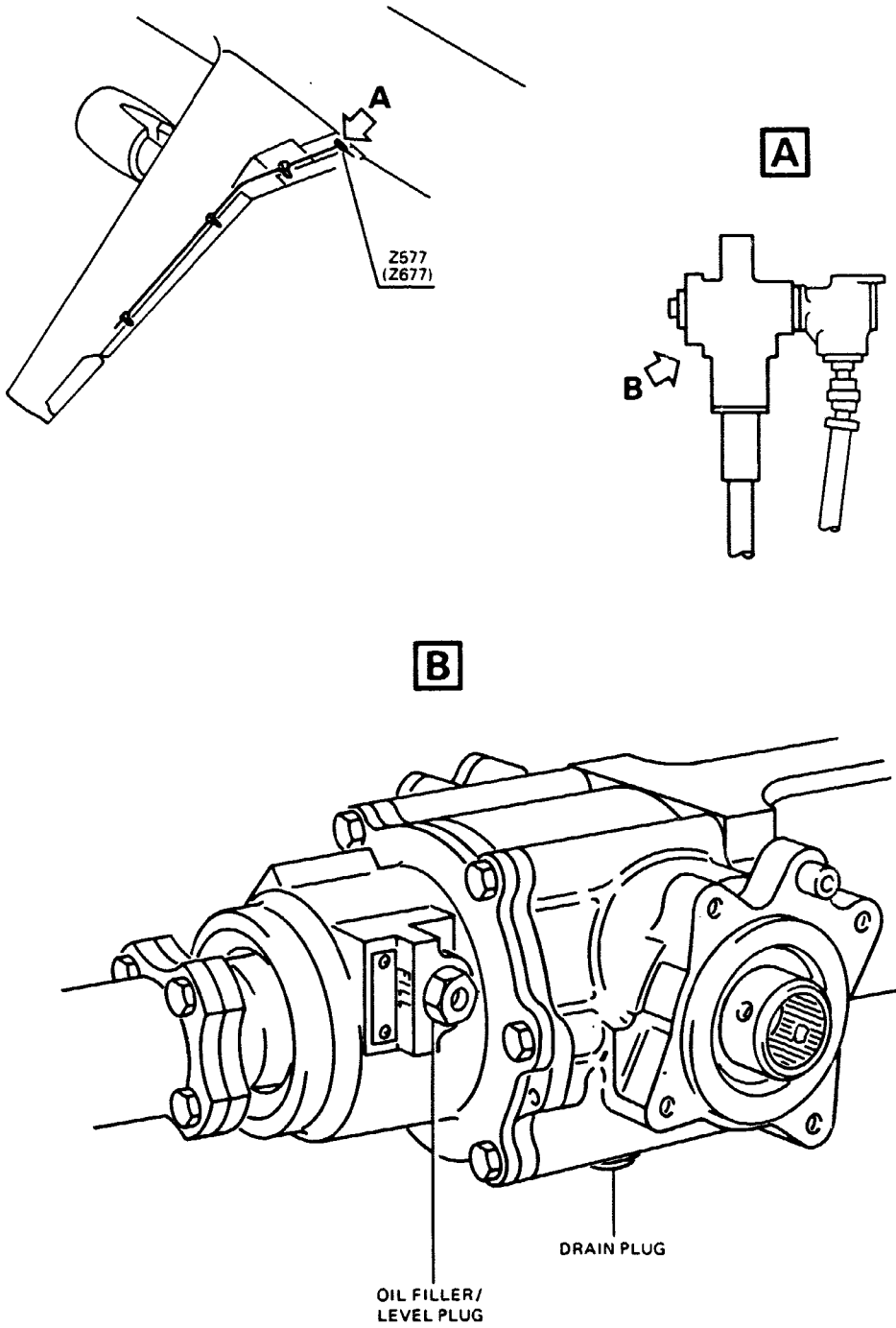
(c)Position container under screwjack.

(2)Draining

(a)Remove oil filler/level plug and discard seal.

NOTE : Due to screwjack being in a different attitude when filled up prior to installation, a quantity of oil may escape when the oil filler/level plug is removed.

(b)Remove drain plug, drain oil into container and measure quantity. Make sure that the drained oil quantity is in accordance with the values given in the table (column 2).



Flap Screwjack No. 1
Figure 005

(c)Discard seal and install new seal on drain plug.
(d)Install drain plug. TORQUE drain plug to 1.25 and 1.5 m.daN (9 and 11 lbf.ft.).

(3)Filling
(a)Using a suitable squeeze bottle, top-up the housing with oil (Material No. 02-001) until it flows from the base of filler opening, refer to the values in the table (column 3).
(b)Install oil filler/level plug with new seal. TORQUE plug to between 1.25 and 1.5 m.daN (9 and 11 lbf.ft.).

(4)Close-Up
(a)Wipe off all traces of oil.
(b)Remove container.
(c)Remove access platform.
(d)Retract flaps to '0' position (Ref. 27-50-00, P. Block 301).

7. Flap Screwjacks No. 2 thru 4

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.4 m to 4 m (8 ft. to 13 ft.)
(2)	Suitable Squeeze Bottle
(3)	Torque Wrench, 1.25 to 1.5 m.daN (9 to 11 lbf.ft.)
(4)	Seals
(5)	Container
(6)	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
(7)Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedure - 27-50-00, P. Block 301	Flaps

B. Procedure

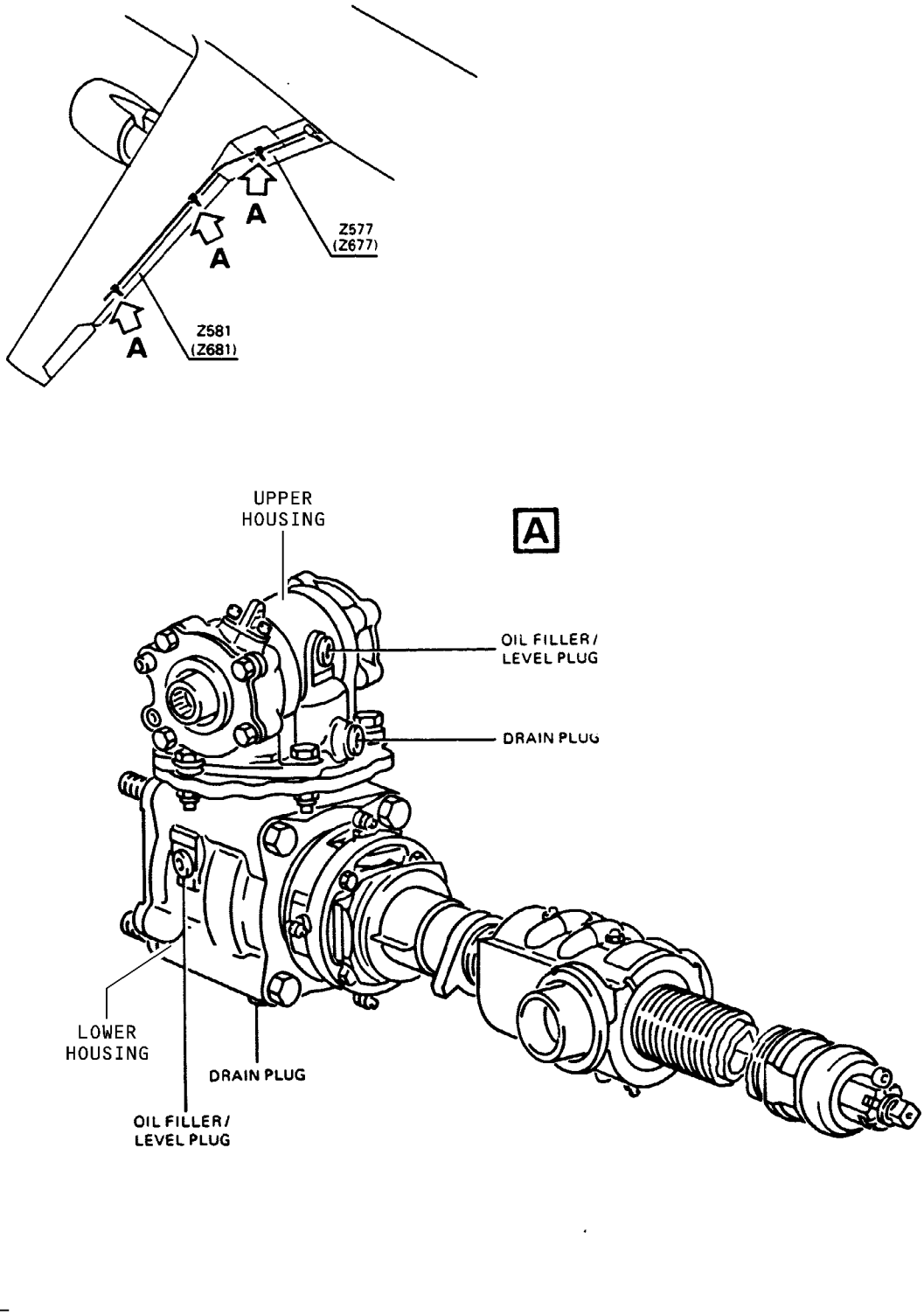
CAUTION : BEFORE THE PROCEDURE IS CARRIED OUT, OBEY THE RECOMMENDATIONS GIVEN IN PARAGRAPH 1. GENERAL.

(Ref. Fig. 006)

(1)Job Set-Up
(a)Extend flaps to '15' deg. position (Ref. 27-50-00, P. Block 301).
NOTE : Extensions of flaps to '20' and '40' deg. positions is also possible.
(b)Position access platform.
R (c)Lower movable fairings (Ref. 27-50-21, P.Block 401).
(d)Position container below screwjack.

(2)Draining
(a)Remove oil filler/level plug from upper housing and discard seal.

NOTE : Due to screwjacks being in a different attitude when filled up



Flap Screwjacks No. 2 thru 4
Figure 006

prior to installation, a quantity of oil may escape when the oil filler/level plug is removed.

(b)Cut and remove lockwire from drain plug.
(c)Remove drain plug, drain oil into container and measure quantity. Make sure that the drained oil quantity is in accordance with the values given in the table (column 2).
(d)Remove oil filler/level plug from lower housing and discard seal.

NOTE : Due to screwjacks being in a different attitude when filled up prior to installation, a quantity of oil may escape when the oil filler/level plug is removed.

(e)Cut and remove lockwire from drain plug.
(f)Remove drain plug, drain oil into container and measure quantity. Make sure that the drained oil quantity is in accordance with the values given in the table (column 2).
(g)Discard seals and install new seals on drain plugs.
(h)Install drain plugs. TORQUE drain plugs to 1.25 and 1.5 m.daN (9 and 11 lbf.ft.).
(j)Safety drain plugs with lockwire.

(3)Filling
(a)Using a suitable squeeze bottle, top-up the housings with oil (Material No. 02-001) until it flows from the base of filler opening, refer to the values in the table (column 3).
(b)Install oil filler/level plugs with new seals. TORQUE plugs to between 1.25 and 1.5 m.daN (9 and 11 lbf.ft.).

(4)Close-Up
(a)Wipe off all traces of oil.
(b)Remove container from below screwjack.
(c)Remove access platform.
(d)Retract flaps to '0' position (Ref. 27-50-00, P. Block 301).

8. Slat Power Control Unit

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.5 m (8 ft. 4 in.)
(2)	Torque Wrench, 2.0 to 3.74 m.daN (14.8 to 27.5 lbf.ft.)
(3)	Seal
(4)	Container
(5)	Suitable Squeeze Bottle
(6)	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
(7)Material No. 03-003	Oils (Ref. 20-31-00)

Referenced Procedure

- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure

CAUTION : BEFORE THE PROCEDURE IS CARRIED OUT, OBEY THE RECOMMENDATIONS GIVEN IN PARAGRAPH 1. GENERAL.

(Ref. Fig. 007)

(1)Job-Set Up

NOTE : The slats may be in any position during filling procedure.

(a)Open one of the main landing gear doors (Ref. 32-12-11, P. Block 301).
(b)Position access platform.

(2)Oil level check

(a)Remove oil filler/level plug and discard seal.
(b)If the oil level is lower than the base of the filler plug opening, fill the slat power control unit.
1 Record the quantity of oil used to fill the slat power control unit to the required level.
2 Use a suitable squeeze bottle to top-up the PCU with oil (Material No. 03-003) until it flows from the base of the filler plug opening.
3 Make sure that the added oil quantity is in accordance with the values given in the table (column 1).
(c)Install new seal on oil filler/level plug.
(d)Install oil filler/level plug.
(e)TORQUE oil filler/level plug to between 3.4 and 3.74 m.daN (25 and 27.5 lb.ft.).

(3)If it is necessary to drain the unit, proceed as follows:

(4)Draining

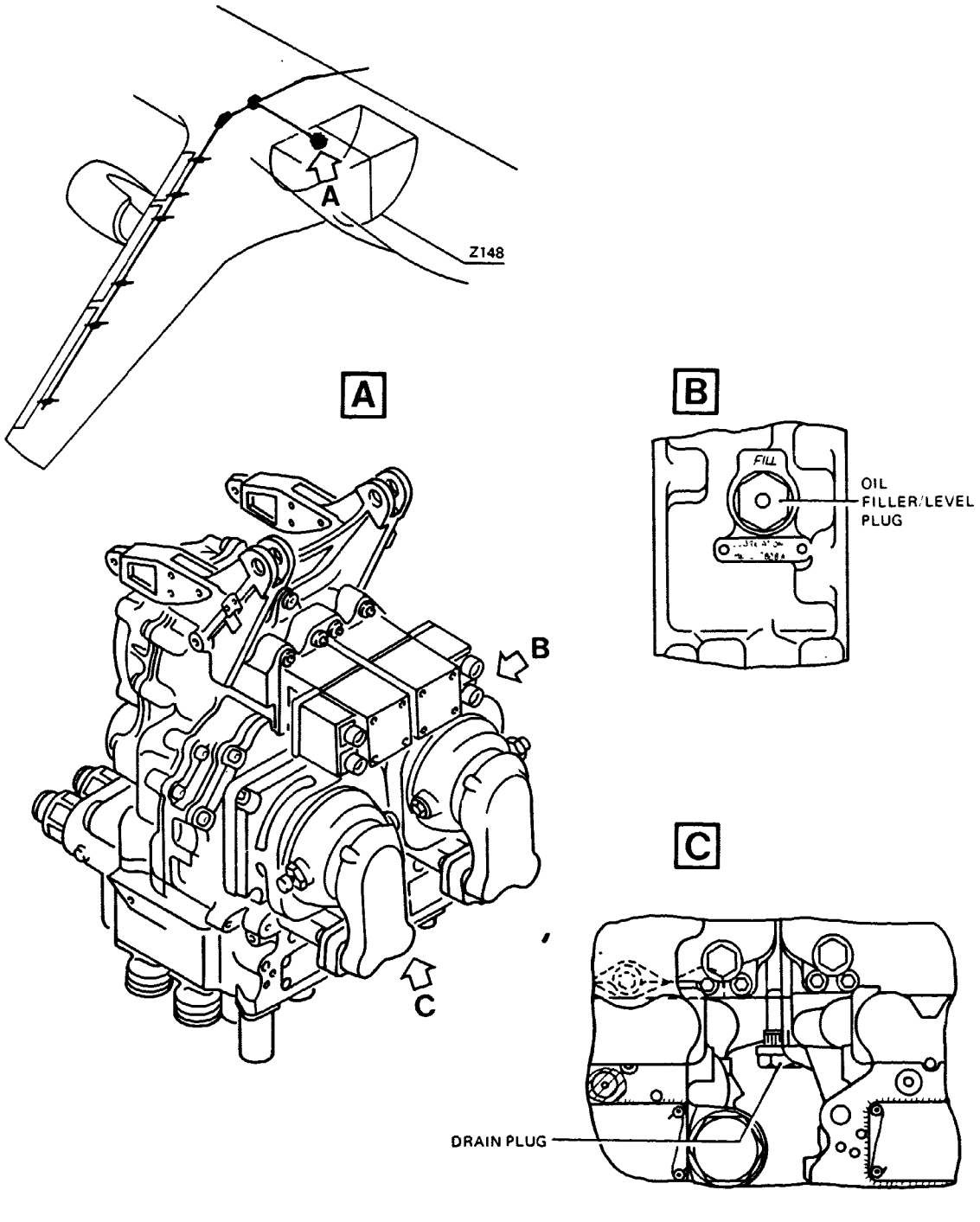
(a)Remove oil filler/level plug and discard seal.
(b)Position container below slat power control unit (PCU).
(c)Cut and remove lockwire from drain plug.
(d)Remove drain plug and drain oil into container. Check quantity of drained oil. Discard seal.
(e)Install new seal on drain plug.
(f)Install drain plug.
(g)TORQUE drain plug to between 2.0 and 2.5 m.daN (14.8 and 18.4 lbf.ft.).
(h)Safety drain plug with lockwire.

(5)Filling

(a)Fill PCU with oil (Material No. 03-003) until it flows from the base of the filler plug opening.
(b)Install new seal on oil filler/level plug.
(c)Install oil filler/level plug.
(d)TORQUE oil filler/level plug to between 3.4 and 3.74 m.daN (25 and 27.5 lb.ft.).

(6)Close-Up

(a)Wipe off all traces of oil.
(b)If necessary remove container from below PCU.
(c)Remove access platform.
(d)Close main landing gear door (Ref. 32-12-11, P. Block 301).



Slat Power Control Unit
Figure 007

9. Slat T-Gearbox

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.5 m (8 ft. 4 in.)
(2)	Torque Wrench, 1.36 m.daN (10 lbf.ft.)
(3)	Seals
(4)	Container
(5)	Suitable Squeeze Bottle
(6)	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
(7)Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedure	
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure

CAUTION : BEFORE THE PROCEDURE IS CARRIED OUT, OBEY THE RECOMMENDATIONS GIVEN IN PARAGRAPH 1. GENERAL.

(Ref. Fig. 008)

(1)Job Set-Up

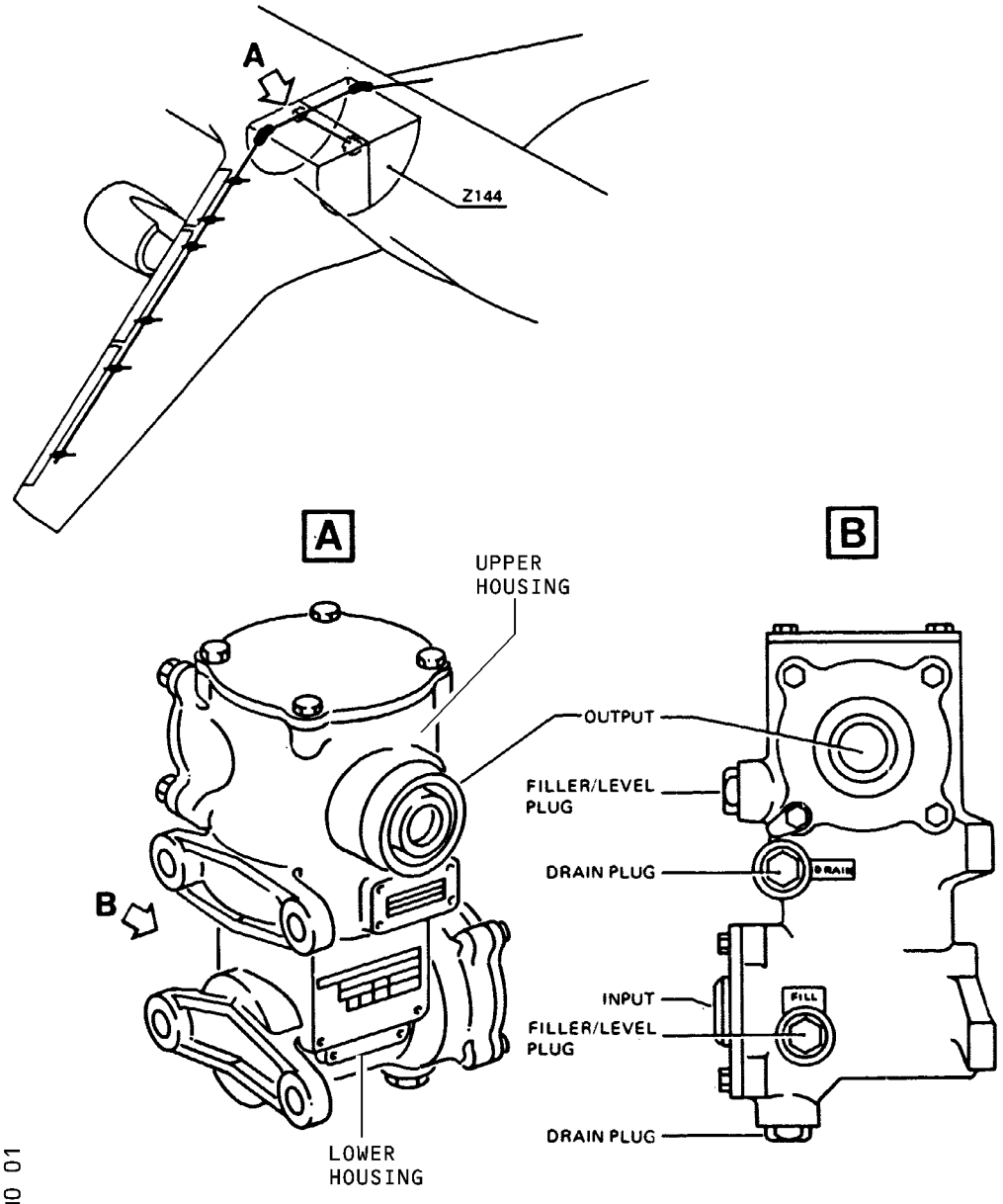
NOTE : The slats may be in any position during filling procedure.

(a)Open one of the main landing gear doors (Ref. 32-12-11, P. Block 301).
(b)Position access platform.
(c)Remove access door 147BZ.

(2)Oil level check

(a)Remove oil filler/level plug from upper housing and discard seal.
(b)If the oil level is lower than the base of the filler plug opening, fill the slat T-gearbox.
1 Record the quantity of oil used to fill the slat T-gearbox to the required level.
2 Use a suitable squeeze bottle to top-up the upper housing of the slat T-gearbox with oil (Material No. 02-001) until it flows from the base of the filler plug opening.
3 Make sure that the added oil quantity is in accordance with the values given in the table (column 1).
(c)Remove oil filler/level plug from lower housing and discard seal.
(d)If the oil level is lower than the base of the filler plug opening:
- use a suitable squeeze bottle to top-up the lower housing of the slat T-gearbox with oil (Material No. 02-001) until it flows from the base of the filler plug opening.
- make sure that the added oil quantity is in accordance with the values given in the table (column 1).

NOTE : If you have found a small quantity of oil in the upper housing



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Slat T-Gearbox
Figure 008

and a large quantity of oil in the lower housing, a damaged internal seal can be the reason. In this case the gearbox must be replaced.

(e)Install new seals on oil filler/level plugs.
(f)Install oil filler/level plugs on upper and lower housing.
(g)TORQUE oil filler/level plugs to 1.36 m.daN (10 lb.ft.).
(3)If it is necessary to drain the unit, proceed as follows:
(4)Draining
(a)Remove oil filler/level plug and discard seal.
(b)Position container below slat T-gearbox.
(c)Cut and remove lockwire from drain plugs.
(d)Remove drain plugs and drain oil into container. Check quantity of drained oil. Discard seals.
(e)Install new seals on drain plugs.
(f)Install drain plugs.
(g)TORQUE drain plugs to 1.36 m.daN (10 lbf.ft.).
(h)Safety drain plugs with lockwire.
(5)Filling
(a)Fill slat T-gearbox with oil (Material No. 02-001) until it flows from the base of the filler plug opening.
(b)Install new seal on oil filler/level plug.
(c)Install oil filler/level plug.
(d)TORQUE oil filler/level plug to 1.36 m.daN (10 lb.ft.).
(6)Close-Up
(a)Wipe off all traces of oil.
(b)If necessary remove container from below slat T-gearbox.
(c)Install access door 147BZ.
(d)Remove access platform.
(e)Close main landing gear door (Ref. 32-12-11, P. Block 301).

10.Slat Torque Limiter

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.5 m (8 ft. 4 in.)
(2)	Torque Wrench, 1.23 to 1.5 m.daN (9.1 to 11.1 lbf.ft.)
(3)	Seal
(4)	Container
(5)	Suitable Sqeeze Bottle
(6)	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
(7)Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)

Referenced Procedure

- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure

CAUTION : BEFORE THE PROCEDURE IS CARRIED OUT, OBEY THE RECOMMENDATIONS GIVEN IN PARAGRAPH 1. GENERAL.

(Ref. Fig. 009)

(1)Job Set-Up

NOTE : The slats may be in any position during filling procedure.

(a)Open one of the main landing gear doors (Ref. 32-12-11, P. Block 301).
(b)Position access platform.

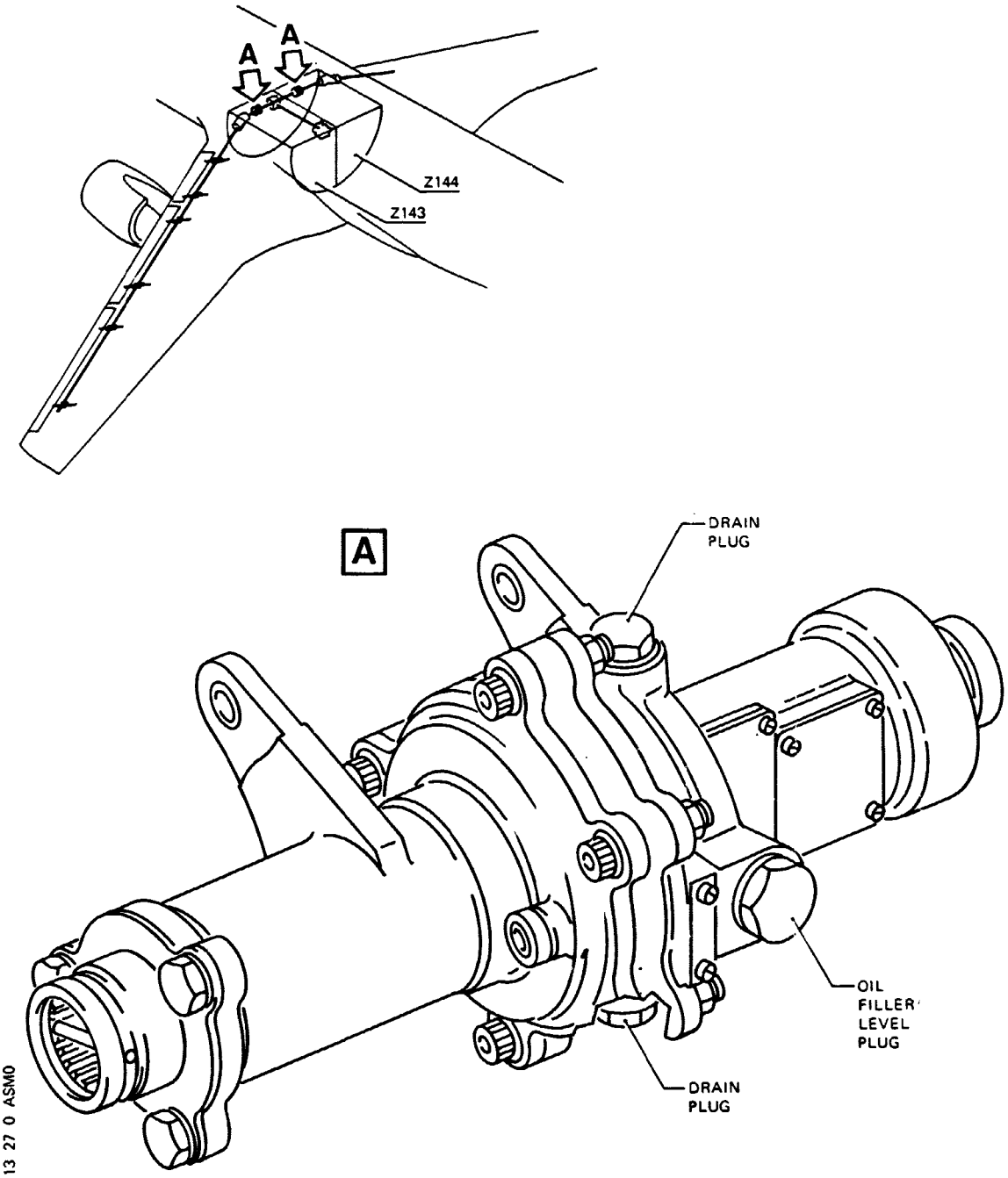
(2)Oil level check
(a)Remove oil filler/level plug and discard seal.
(b)If the oil level is lower than the base of the filler plug opening, fill the slat torque limiter.
1 Record the quantity of oil used to fill the slat torque limiter to the required level.
2 Use a suitable squeeze bottle to top-up the slat torque limiter with oil (Material No. 02-001) until it flows from the base of the filler plug opening.
3 Make sure that the added oil quantity is in accordance with the values given in the table (column 1).
(c)Install new seal on oil filler/level plug.
(d)Install oil filler/level plug.
(e)TORQUE oil filler/level plug to between 1.23 and 1.5 m.daN (9.1 and 11.1 lbf.ft.).

(3)If it is necessary to drain the unit, proceed as follows:

(4)Draining
(a)Remove oil filler/level plug and discard seal.
(b)Position container below slat torque limiter.
(c)Cut and remove lockwire from drain plug.
(d)Remove drain plug and drain oil into container. Check quantity of drained oil. Discard seal.
(e)Install new seal on drain plug.
(f)Install drain plug.
(g)TORQUE drain plug to between 1.23 and 1.5 m.daN (9.1 and 11.1 lbf.ft.).
(h)Safety drain plug with lockwire.

(5)Filling
(a)Fill slat torque limiter with oil (Material No. 02-001) until it flows from the base of the filler plug opening.
(b)Install new seal on oil filler/level plug.
(c)Install oil filler/level plug.
(d)TORQUE oil filler/level plug to between 1.23 and 1.5 m.daN (9.1 and 11.1 lbf.ft.).

(6)Close-Up
(a)Wipe off all traces of oil.
(b)If necessary remove container from below torque limiter.
(c)Install access door 147BZ.
(d)Remove access platform.
(e)Close main landing gear door (Ref. 32-12-11, P. Block 301).



Slat Torque Limiter
Figure 009

11.Slat Wing Root Gearbox

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.5 m (8 ft. 4 in.)
(2)	Torque Wrench, 1.36 m.daN (10 lbf.ft.)
(3)	Seal
(4)	Container
(5)	Suitable Squeeze Bottle
(6)	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
(7)Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)

B. Procedure

CAUTION : BEFORE THE PROCEDURE IS CARRIED OUT, OBEY THE RECOMMENDATIONS GIVEN IN PARAGRAPH 1. GENERAL.

(Ref. Fig. 010)

(1)Job Set-Up

NOTE : The slats may be in any position during filling procedure.

(a)Position access platform.

(b)Remove access doors 513RL (613RR).

(2)Oil level check

(a)Remove oil filler/level plug and discard seal.

(b)If the oil level is lower than the base of the filler plug opening, fill the slat wing root gearbox.

1 Record the quantity of oil used to fill the slat wing root gearbox to the required level.

2 Use a suitable squeeze bottle to top-up the slat wing root gearbox with oil (Material No. 02-001) until it flows from the base of the filler plug opening.

3 Make sure that the added oil quantity is in accordance with the values given in the table (column 1).

(c)Install new seal on oil filler/level plug.

(d)Install oil filler/level plug.

(e)TORQUE oil filler/level plug to 1.36 m.daN (10 lb.ft.).

(3)If it is necessary to drain the unit, proceed as follows:

(4)Draining

(a)Remove oil filler/level plug and discard seal.

(b)Position container below slat wing root gearbox.

(c)Cut and remove lockwire from lower drain plug.

(d)Remove drain plug and drain oil into container. Check quantity of drained oil. Discard seal.

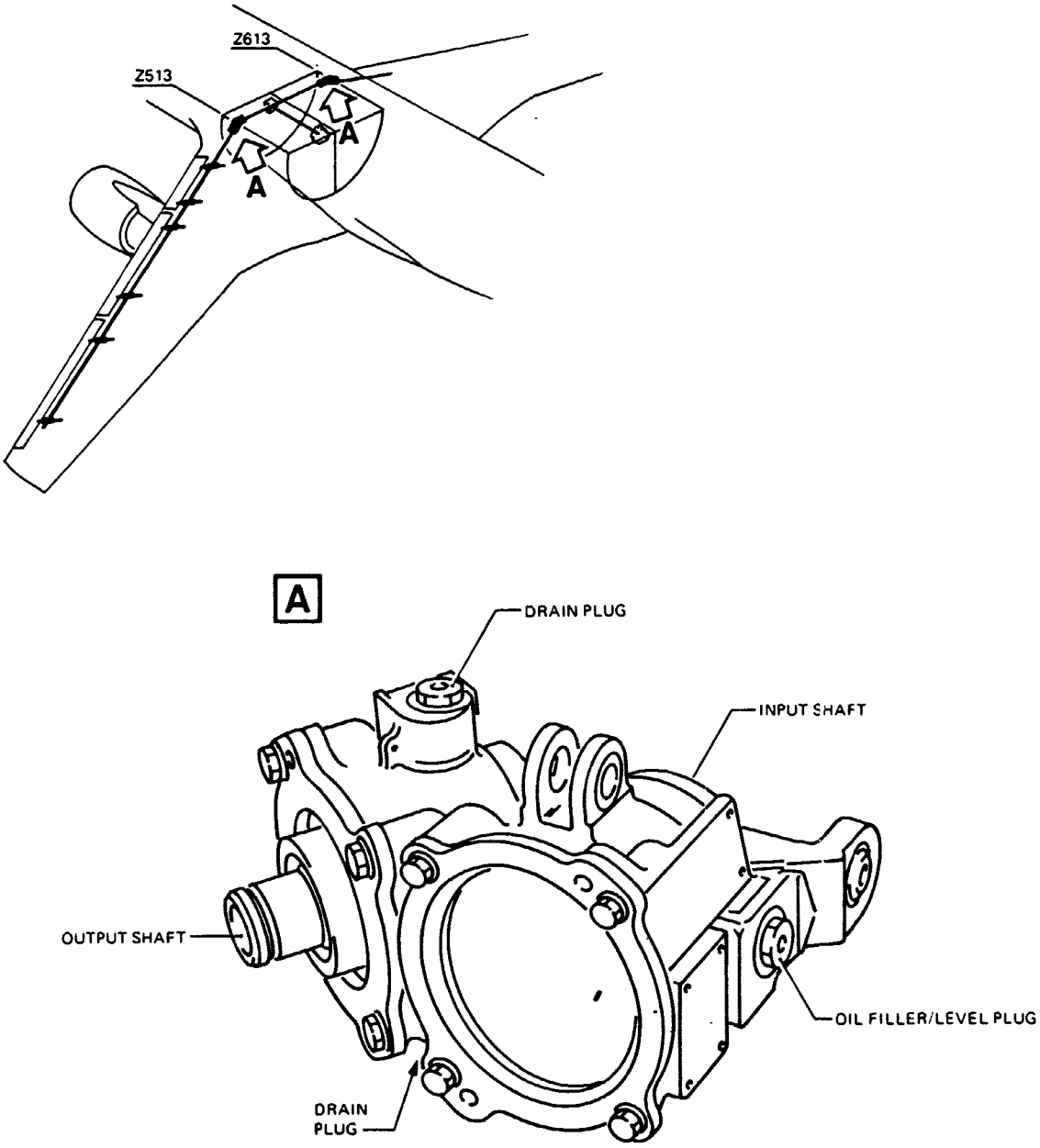
(e)Install new seal on drain plug.

(f)Install drain plug.

(g)TORQUE drain plug to 1.36 m.daN (10 lbf.ft.).

(h)Safety drain plug with lockwire.

(5)Filling



Slat Wing Root Gearbox
Figure 010

(a)Fill gearbox with oil (Material No. 02-001) until it flows from the base of the filler plug opening.
(b)Install new seal on oil filler/level plug.
(c)Install oil filler/level plug.
(d)TORQUE oil filler/level plug to 1.36 m.daN (10 lb.ft.).

(6)Close-Up
(a)Wipe off all traces of oil.
(b)If necessary remove container from below gearbox.
(c)Install access doors 513RL (613RR).
(d)Remove access platform.

12.Slat Line Gearbox

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.5 m (11 ft. 6 in.)
(2)	Torque Wrench, 1.36 m.daN (10 lbf.ft.)
(3)	Seal
(4)	Container
(5)	Suitable Squeeze Bottle
(6)	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
(7)Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)

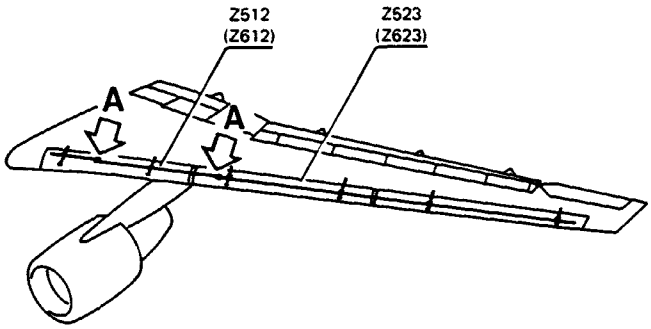
B. Procedure

CAUTION : BEFORE THE PROCEDURE IS CARRIED OUT, OBEY THE RECOMMENDATIONS GIVEN IN PARAGRAPH 1. GENERAL.

(Ref. Fig. 011)

(1)Job Set-Up
NOTE : The slats may be in any position during filling procedure.
(a)Position access platform.
(b)Remove access doors:
Line gearbox at Track 2 - 512EB (612EB)
Line gearbox at Track 4 - 523BB (623BB)

(2)Oil level check
(a)Remove oil filler/level plug and discard seal.
(b)If the oil level is lower than the base of the filler plug opening, fill the slat line gearbox.
1 Record the quantity of oil used to fill the slat line gearbox to the required level.
2 Use a suitable squeeze bottle to top-up the slat line gearbox with oil (Material No. 02-001) until it flows from the base of the filler plug opening.
3 Make sure that the added oil quantity is in accordance with the values given in the table (column 1).
(c)Install new seal on oil filler/level plug.
(d)Install oil filler/level plug.



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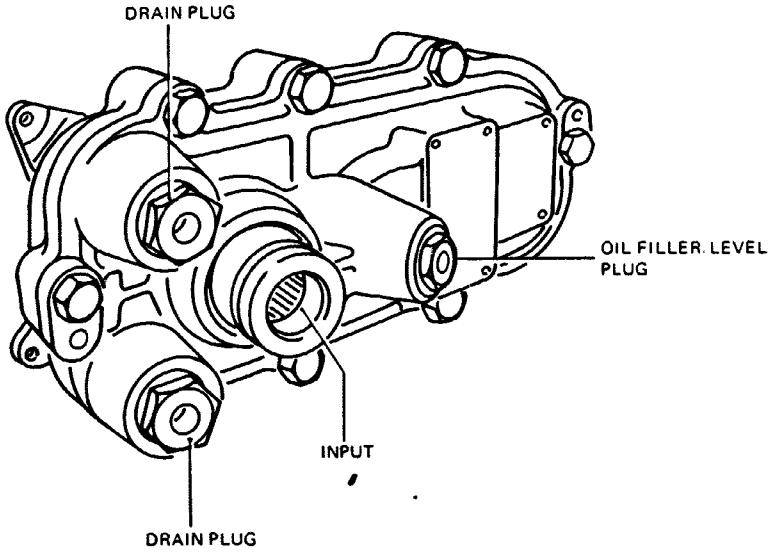

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Slat Line Gearbox
Figure 011

(e)TORQUE oil filler/level plug to 1.36 m.daN (10 lb.ft.).
(3)If it is necessary to drain the unit, proceed as follows:
(4)Draining
(a)Remove oil filler/level plug and discard seal.
(b)Position container below slat line gearbox.
(c)Cut and remove lockwire from lower drain plug.
(d)Remove drain plug and drain oil into container. Check quantity of drained oil. Discard seal.
(e)Install new seal on drain plug.
(f)Install drain plug.
(g)TORQUE drain plug to 1.36 m.daN (10 lbf.ft.).
(h)Safety drain plug with lockwire.
(5)Filling
(a)Fill gearbox with oil (Material No. 02-001) until it flows from the base of the filler plug opening.
(b)Install new seal on oil filler/level plug.
(c)Install oil filler/level plug.
(d)TORQUE oil filler/level plug to 1.36 m.daN (10 lb.ft.).
(6)Close-Up
(a)Wipe off all traces of oil.
(b)If necessary remove container from below gearbox.
(c)Install access doors.
(d)Remove access platform.

13.Slat Screwjacks No. 1 thru 6

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.1 m (7 ft.) to 5 m (16 ft.)
(2)532703161	Lubrication Unit
(3)	Torque Wrench, 3.4 to 3.74 m.daN (25 and 27.5 lbf.ft.)
(4)	Seal
(5)	Container
(6)	Suitable Squeeze Bottle
(7)	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
(8)Material No. 02-001	Hydraulic Fluids (Ref. 20-31-00)

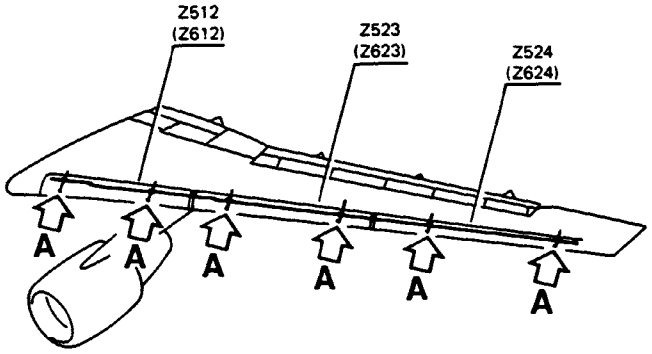
Referenced Procedure

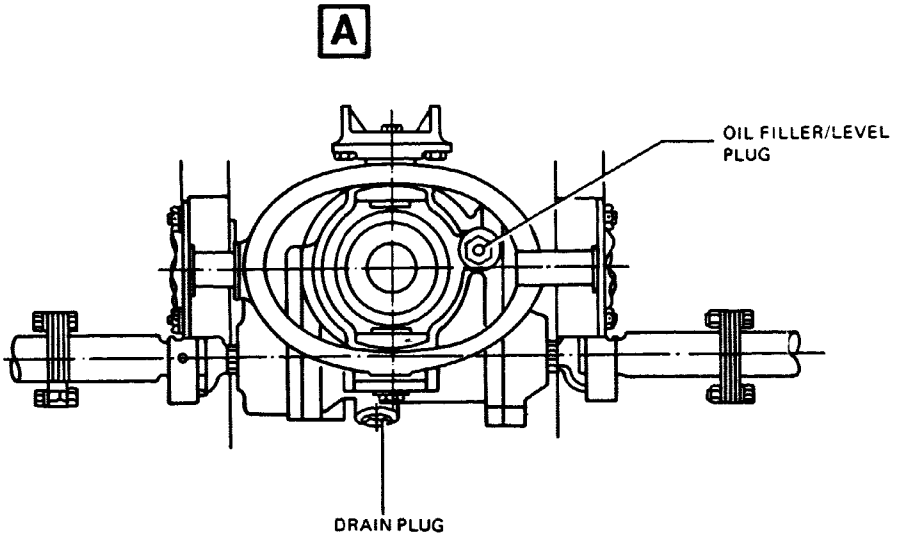
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)

B. Procedure

CAUTION : BEFORE THE PROCEDURE IS CARRIED OUT, OBEY THE RECOMMENDATIONS GIVEN IN PARAGRAPH 1. GENERAL.

(Ref. Fig. 012)
(1)Job Set-Up





BM3 12 13 27 0 AYM0

Slat Screwjacks No. 1 thru 6
Figure 012

(a)Extend slats to '30' deg. position (Ref. 27-80-00, P. Block 301).
(b)Position access platform.
(c)Remove access doors:

SCREWJACK	ACCESS DOOR LH	RH
No. 1	512CB	612CB
No. 2	512HB	612HB
No. 3	523DB	623DB
No. 4	523KB	623KB
No. 5	524DB	624DB
No. 6	524JB	624JB

(d)Position container below screwjack.
(2)Draining
(a)Remove oil filler/level plug and discard seal.

NOTE : Due to screwjack being in a different attitude when filled up prior to installation, a quantity of oil may escape when the oil filler/level plug is removed.

(b)Remove drain plug, drain oil into container and measure quantity. Make sure that the drained oil quantity is in accordance with the values given in the table (column 2).
(c)Discard seal and install new seal on drain plug.
(d)Install drain plug. TORQUE drain plug to between 3.4 and 3.74 m.daN (25 and 27.5 lbf.ft.).
(a)Using a suitable squeeze bottle, top-up the housing with oil (Material No. 02-001) until it flows from the base of filler opening, refer to the values in the table (column 3).
(b)Install oil filler/level plug with new seal. TORQUE plug to between 3.4 and 3.74 m.daN (25 and 27.5 lbf.ft.).
(4)Close-Up
(a)Wipe off all traces of oil.
(b)Remove container from below screwjack.
(c)Close access doors.
(d)Remove access platform.
(e)Retract slats to '0' position (Ref. 27-80-00, P. Block 301).

APU - REPLENISHING

WARNING : ALLOW APU TO COOL SUFFICIENTLY TO PREVENT PERSONAL INJURY.
WARNING : DO NOT REMOVE GRAVITY FILLER CAP OR PRESSURE FILL AND OVERFLOW PORT BLANKING CAPS WHEN OIL IS HOT OR ABOVE ADD MARK ON SIGHT GLASS.
CAUTION : DO NOT OVERFILL RESERVOIR. WHEN LEVER TYPE FILLER CAP IS FITTED MAKE SURE THAT THE OIL LEVEL DOES NOT GO ABOVE FULL MARK ON SIGHT GLASS.
CAUTION : MAKE SURE THAT THE OIL OVERFLOW HOSE IS FITTED TO OVERFLOW PORT BEFORE PRESSURE FILLING RESERVOIR. DO NOT REMOVE OVERFLOW HOSE UNTIL EXCESS OIL HAS DRAINED.
CAUTION : DO NOT USE NON-APPROVED OR MIXTURES OF BRANDS OR TYPES OF OIL.

1. Replenishing of APU Oil System

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 6 m (20 ft.)
(2)	Container, 10l (2.6 US gal.) Capacity
(3)	Circuit Breaker Safety Clips and Tags
(4)98A1200101700	Tank - Engine Oil Filling Up (Portable Type)
or	
(5)DH13PM	Tank - Engine Oil Filling Up (Portable Type)

(6)Use the following oil brands and types

APPROVED OIL BRAND NAME	AMBIENT TEMPERATURE MINIMUM	AMBIENT TEMPERATURE MAXIMUM
SPECIFICATION MIL-PRF-7808, TYPE I		
Aeroshell Turbine Oil 390	-65°F (-54°C)	130°F (54°C)
Brayco 880	-65°F (-54°C)	130°F (54°C)
Castrol 325 or 399	-65°F (-54°C)	130°F (54°C)
BP or Exxon Turbo Oil 2389	-65°F (-54°C)	130°F (54°C)
SPECIFICATION MIL-PRF-23699, TYPE II		
Aeroshell Turbine Oil or Royco 500	-40°F (-40°C)	130°F (54°C)
Aeroshell Turbine Oil or Royco 555	-40°F (-40°C)	130°F (54°C)
Aeroshell Turbine Oil or Royco 560	-40°F (-40°C)	130°F (54°C)
Castrol Aero 5000	-40°F (-40°C)	130°F (54°C)
BP or Exxon Turbine Oil 2197	-40°F (-40°C)	130°F (54°C)
BP or Exxon Turbine Oil 2380	-40°F (-40°C)	130°F (54°C)
Hatcol 3611	-40°F (-40°C)	130°F (54°C)
Mobil Jet Oil II	-40°F (-40°C)	130°F (54°C)
Mobil Jet Oil 254	-40°F (-40°C)	130°F (54°C)

APPROVED OIL BRAND NAME	AMBIENT TEMPERATURE MINIMUM	AMBIENT TEMPERATURE MAXIMUM
Mobil Jet Oil 254	-40°F (-40°C)	130°F (54°C)
Mobil Jet Oil 291	-40°F (-40°C)	130°F (54°C)
Royco 899	-40°F (-40°C)	130°F (54°C)

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
131VU	APU/ECB BACK UP/SUPPLY	58KD	B52
131VU	APU/ECB BACK UP/CTL	71KD	B53
131VU	APU/START	50KA	B54
131VU	APU/ECB SUPPLY/MAIN	1KD	B57

(2)Position access platform, open access door 315AL.

(3)Position container below filling ports.

WARNING : ALLOW APU TO COOL SUFFICIENTLY TO PREVENT PERSONAL INJURY.

B. Replenishing
(Ref. Fig. 001, 002, 003)
(1)Gravity Servicing (Bayonet type cap)
(a)Check oil level in sight glass. Add oil if level is on or below the ADD mark on sight glass.
(b)Clean filler cap and gravity fill port area.

WARNING : DO NOT REMOVE FILLER CAP WHEN OIL IS HOT OR ABOVE ADD MARK ON SIGHT GLASS.

(c)Depress and rotate filler cap 90° counterclockwise, pull cap out of filling port and wipe clean.
(d)Inspect O-rings and replace if necessary. Inspect pins and cap for damage and if damaged replace filler plug assembly.

CAUTION : WHEN YOU DO THE SERVICING OF THE APU OIL RESERVOIR, MAKE SURE YOU USE AN APPROVED ENGINE OIL OF THE SAME TYPE AND BRAND. IF YOU MIX DIFFERENT OILS YOU CAN DAMAGE THE APU.

(e)Make sure that the TANK - ENGINE OIL FILLING UP is filled with clean and approved oil which is of the same type and brand than the oil which is in the APU oil reservoir.

R NOTE : If the oil available for oil servicing is a different type
R or brand than the oil in the APU oil reservoir, flush the system
R and change the oil.
R Replenishing method can only be applied if the oil available for
R oil servicing is the same type or brand as the oil in the APU oil
R reservoir.
R Add the new approved oil to the reservoir as necessary, at each
R oil servicing interval to complete the oil change.

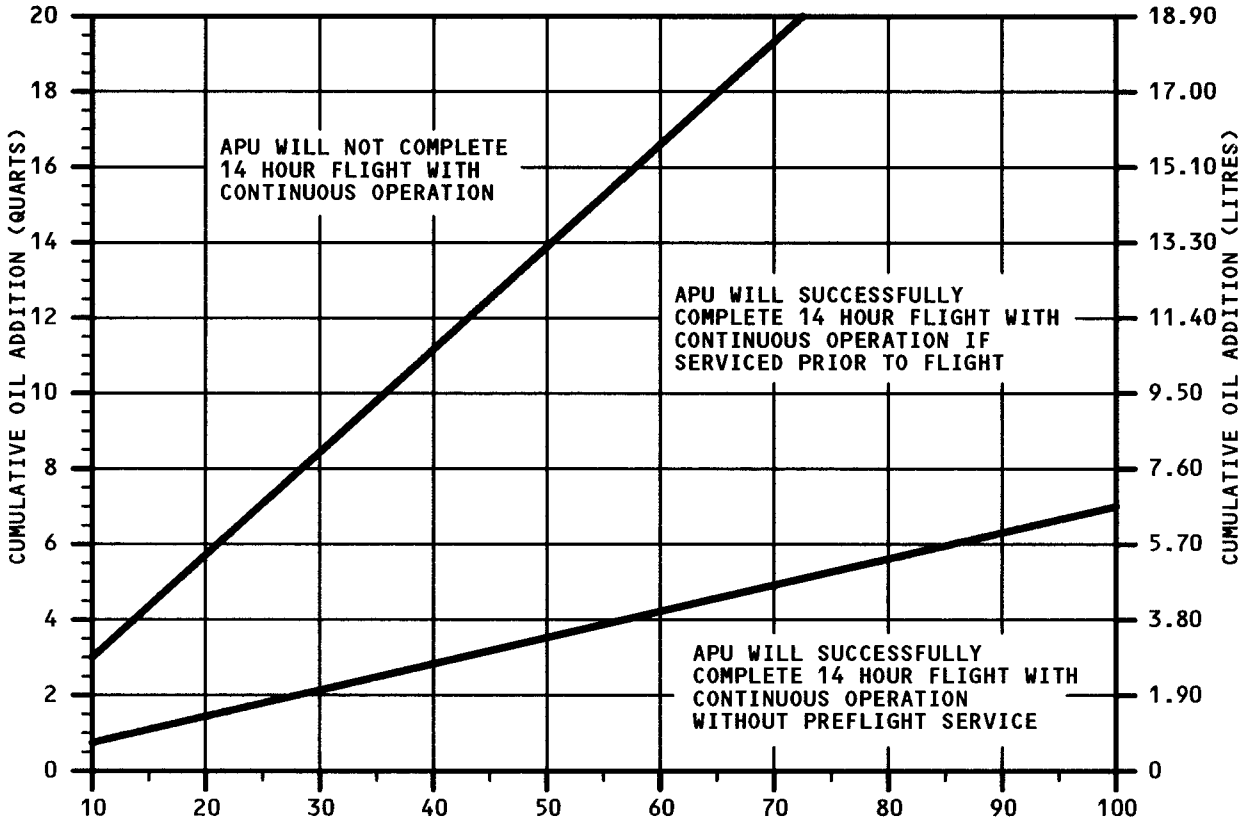
(f)Slowly add oil until level reaches the FULL or SAFE mark on the sight glass
(g)Insert filler cap into filler port.
(h)Depress and rotate 90° clockwise until lockpins engage.

B. Replenishing
(Ref. Fig. 004, 005)
(1)Gravity Servicing (Lever type cap)
(a)Check oil level in sight glass. Add oil if level is on or below the ADD mark on sight glass.
(b)Clean filler cap and gravity fill port area.

WARNING: DO NOT REMOVE FILLER CAP WHEN OIL IS HOT OR ABOVE ADD MARK ON SIGHT GLASS.

(c)Lift lever to unlock the filler cap.
(d)Rotate counterclockwise (CCW), until it contacts the stop.

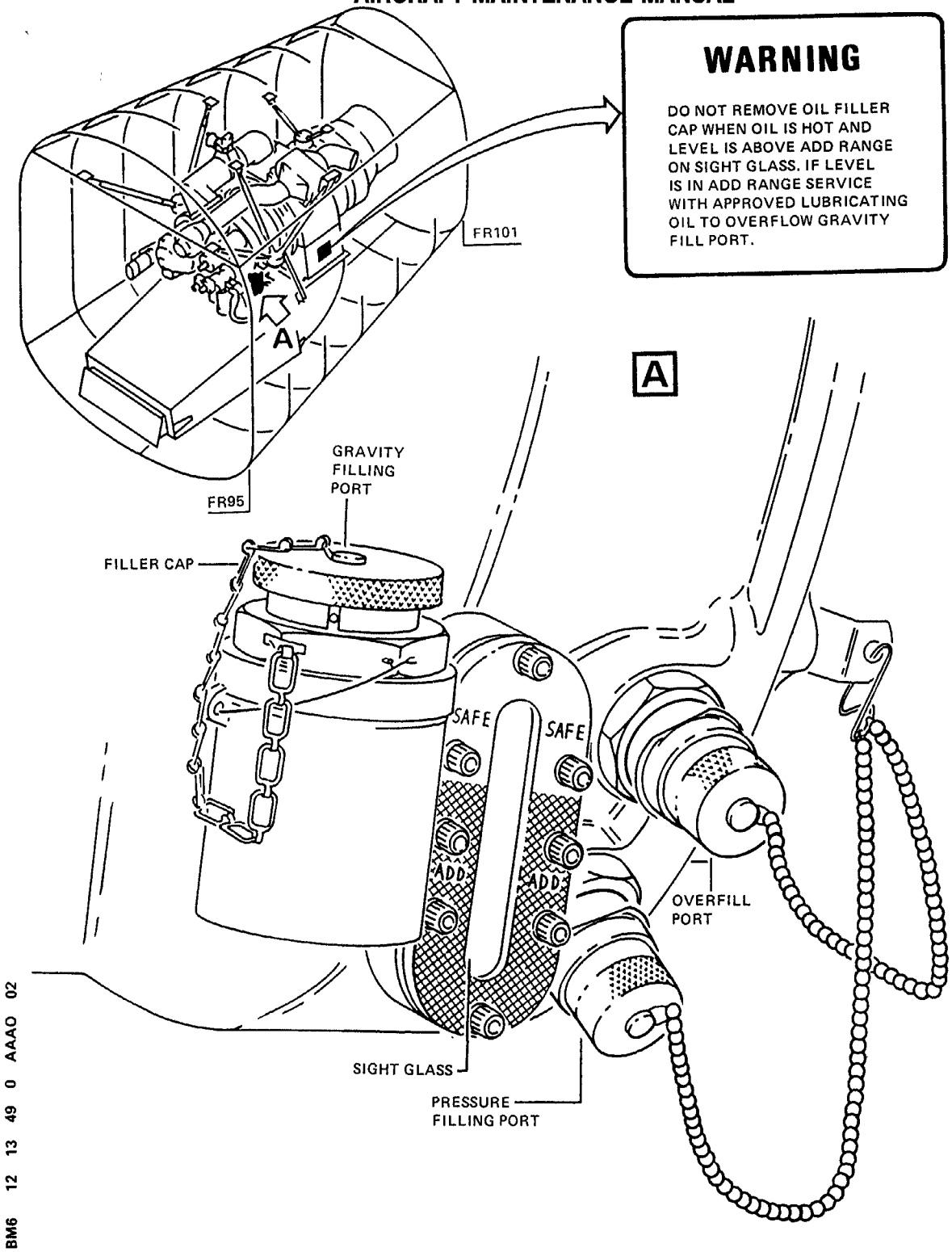
GTCP331 INSTALLED APU
IN-SERVICE OIL CONSUMPTION GUIDELINES



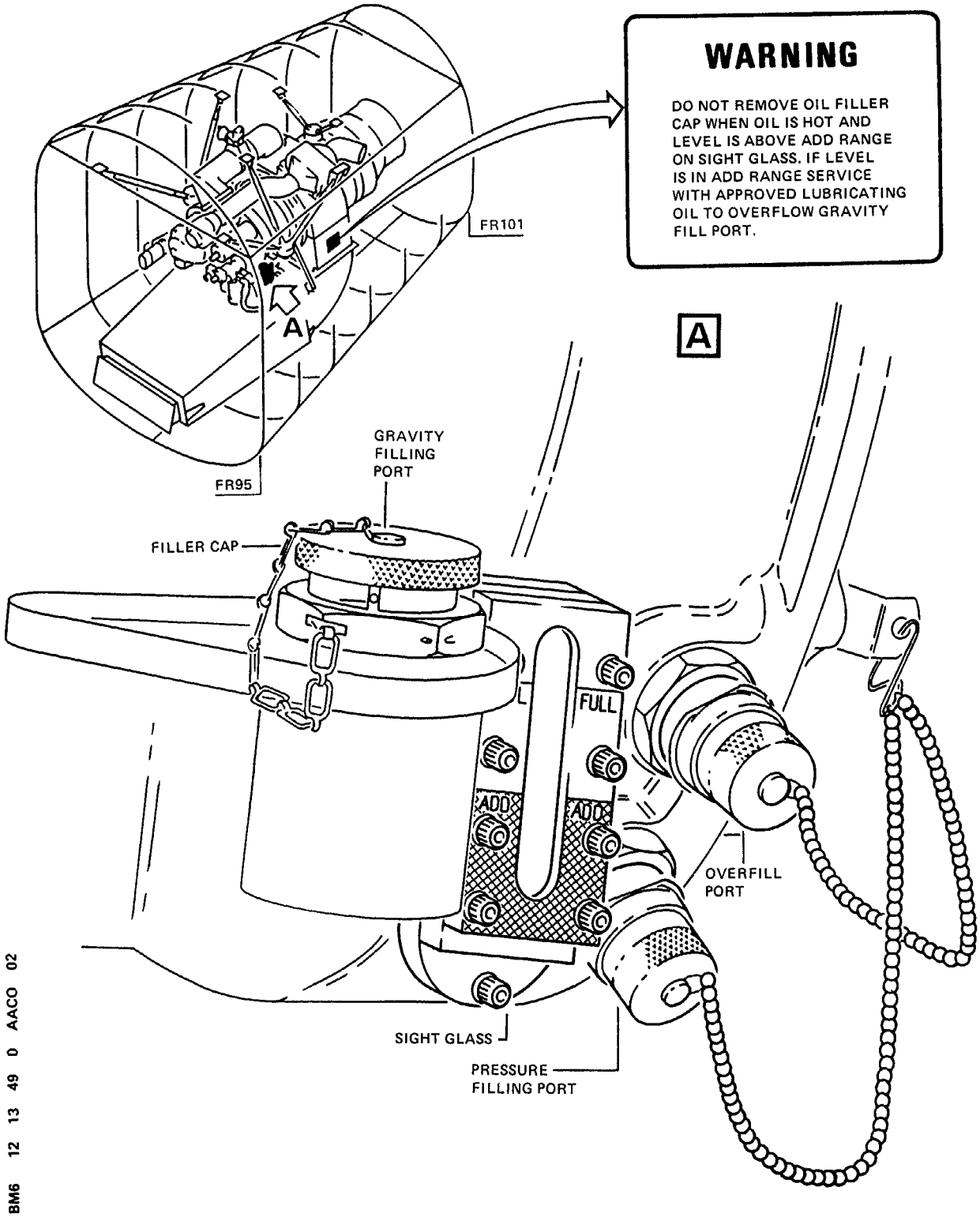
OPERATING TIME PERIOD DURING WHICH OIL
WAS ADDED TO APU AS NOTED ON VERTICAL SCALE

BM6 12 13 49 0 AAJO 01

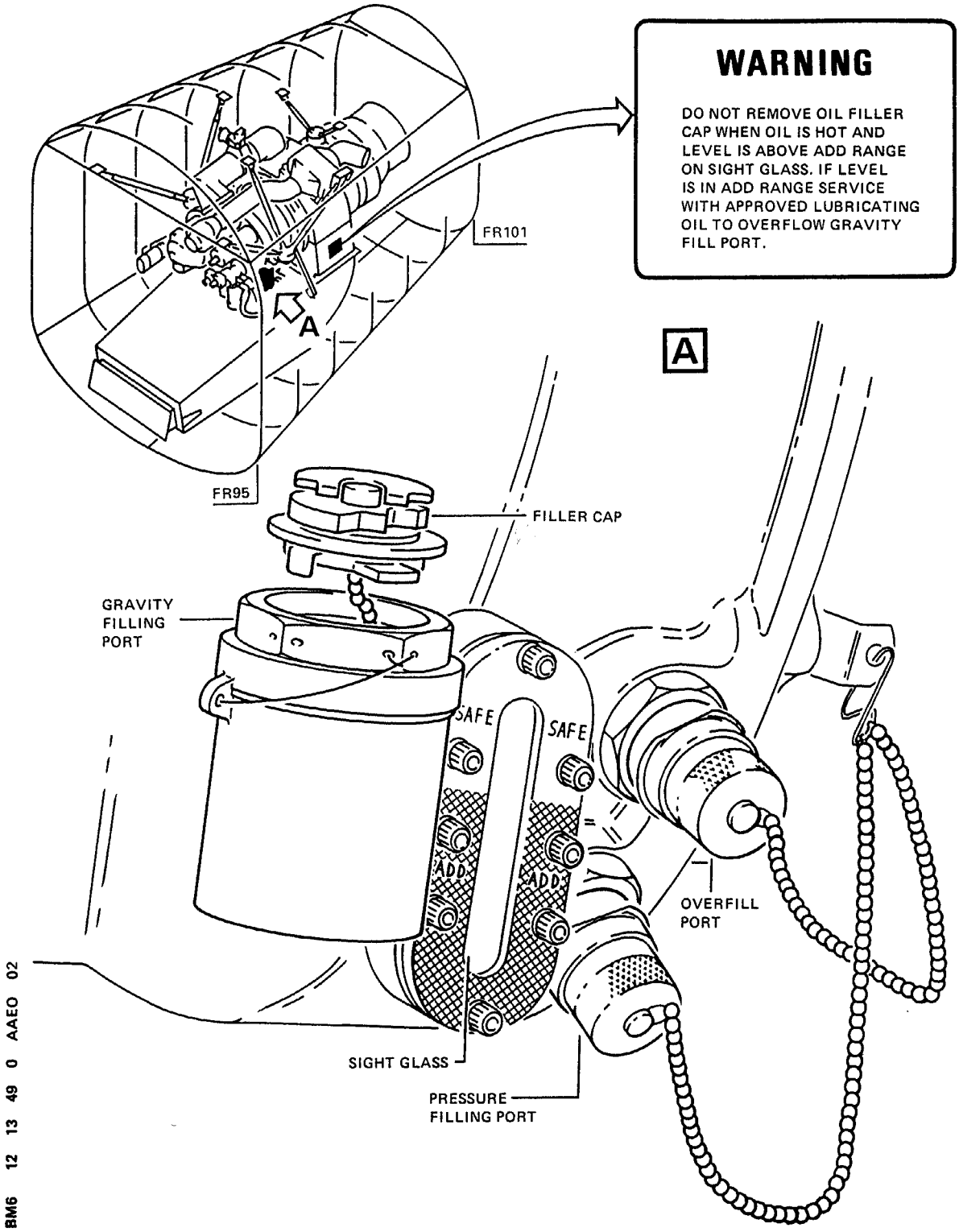
In Service Oil Consumption Guidelines
Figure 001



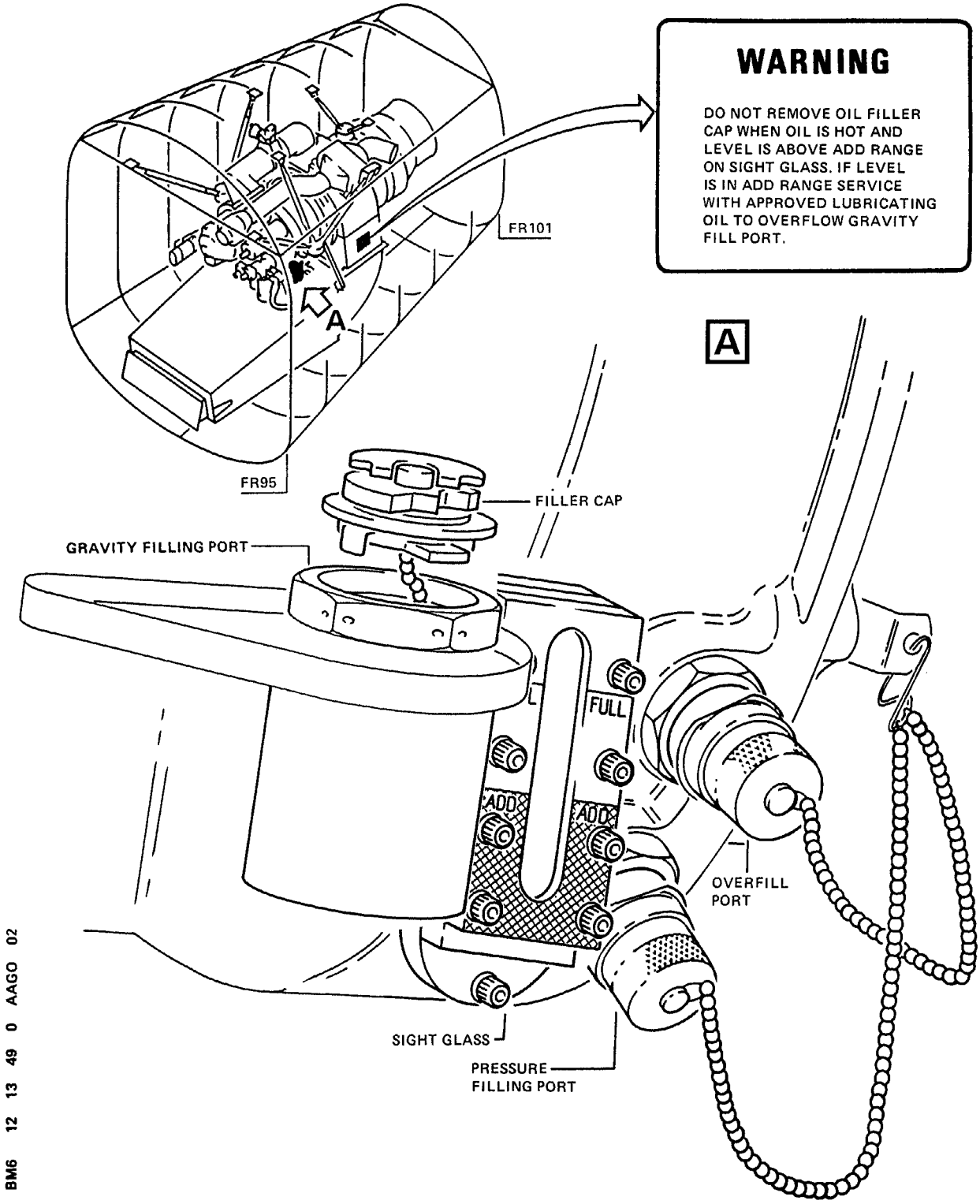
Filling Ports - Location
Figure 002


WARNING
DO NOT REMOVE OIL FILLER CAP WHEN OIL IS HOT AND LEVEL IS ABOVE ADD RANGE ON SIGHT GLASS. IF LEVEL IS IN ADD RANGE SERVICE WITH APPROVED LUBRICATING OIL TO OVERFLOW GRAVITY FILL PORT.
FR101
FR95
A
A
GRAVITY FILLING PORT
FILLER CAP
FULL
ADD
ADD
OVERFILL PORT
SIGHT GLASS
PRESSURE FILLING PORT
BM6 12 13 49 0 AACO 02

Filling Ports - Location
Figure 003



Filling Ports - Location
Figure 004


WARNING
DO NOT REMOVE OIL FILLER CAP WHEN OIL IS HOT AND LEVEL IS ABOVE ADD RANGE ON SIGHT GLASS. IF LEVEL IS IN ADD RANGE SERVICE WITH APPROVED LUBRICATING OIL TO OVERFLOW GRAVITY FILL PORT.
FR101
A
FR95
A
FILLER CAP
GRAVITY FILLING PORT
FULL
ADD
ADD
OVERFILL PORT
SIGHT GLASS
PRESSURE FILLING PORT
BM6 12 13 49 0 AAGO 02

Filling Ports - Location
Figure 005

(e)Rotate filler cap counterclockwise to disengage the locking lugs.
(f)Pull filler cap out of the filling port and wipe clean.
(g)Check filler cap, locking lugs and O-rings for damage.
replace if necessary.

CAUTION: DO NOT OVERFILL RESERVOIR. WHEN LEVER TYPE FILLER CAP IS FITTED MAKE CERTAIN THAT OIL LEVEL DOES NOT GO ABOVE FULL MARK ON SIGHT GLASS.

(h)Slowly add oil until level reaches the FULL or SAFE mark on the sight glass
(j)Put filler cap into filler port.
(k)Rotate filler cap clockwise to engage the locking lugs.
(l)Rotate lever clockwise until it contacts the stop.
(m)Push down the lever to lock the filler cap.

(2)Pressure Servicing using Tank - Engine Filling Up
P/N 98A12001017000 or DH13PM.
(a)Clean blanking caps of pressure filling and overfill ports.

WARNING : DO NOT REMOVE BLANKING CAPS FROM PRESSURE FILLING AND OVERFILL PORTS WHEN OIL IS HOT AND LEVEL IS ABOVE ADD RANGE ON SIGHT GLASS.
(b)Remove blanking caps from pressure filling and overfill ports.
(c)Connect overfill hose to overfill port. Direct hose into container.
(d)Connect filling hose of Tank - Engine Filling Up to pressure filling port.
(e)Pressure Servicing.

CAUTION : MAKE SURE THAT THE OIL OVERFILL HOSE IS FITTED TO OVERFILL PORT BEFORE PRESSURE FILLING RESERVOIR.
(f)Slowly pump oil until excess oil begins to flow out of overfill hose.
CAUTION : DO NOT REMOVE OVERFILL HOSE UNTIL OIL LEVEL IN RESERVOIR HAS STABILIZED AND EXCESS OIL HAS DRAINED.
(g)Make sure that the excess oil drains completely. Wait approx. 2 minutes to allow oil to stabilize in reservoir.
(h)Disconnect overfill hose, pressure filling hose and wipe ports clean.
CAUTION : MAKE SURE THAT THE BLANKING CAPS ARE SECURED ON THE PORTS.

(j)Install blanking caps to their respective ports.

C. Close-Up
(1)Make sure that the working area is clean and clear of tools and other equipment.
(2)Remove container and wipe area clean.
(3)Close access door 315AL.
(4)Remove access platform.
(5)Remove safety clips and tags and close circuit breakers 50KA, 1KD, 58KD and 71KD.

OIL SYSTEM REPLENISHMENT - DESCRIPTION AND OPERATION

1. General

A. Oil system replenishment includes the servicing procedure necessary at regular intervals to prevent damage to the aircraft engine.

B. The oil replenishment system section of this chapter contains general notes, a list of approved oils, and components illustrations. Procedures for the components are given in the sections that follow (Ref. Fig. 001) :

SYSTEM/COMPONENT	QUANTITY U.S QUARTS	BRITISH QUARTS	METRIC LITERS
Engine oil system			
Total oil tank capacity	32.0	26.7	30.3
Tank capacity (fill quantity, wet system)	26.0	21.7	24.6
Tank expansion volume (static volume)	6.0	5.0	5.7

2. Engine Lubricating Oil - Servicing

A. General
This procedure describes the servicing which is to be performed at routine intervals either before or after a flight.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)Model ACT 8800	Combustible GAS Detector Snap-on Tools Corp. Kenosha, WI 53141-1410 USA
(3)Model V-3	Viscometer The Guerin Corp. P.O. Box 307 Neptune, NJ 07717 USA
(4)Model VISPROBE	Viscometer Airborne Analytical Labs P.O. Box 518

ITEM	DESIGNATION
	East Hanover NJ 07936 USA
Referenced Procedures	
- 79-00-00, P. Block 301	Oil-General
- 79-22-02, P. Block 401	Fuel/Oil Heat Exchanger

C. Procedure (Ref. Fig. 002)

(1)Job set-up

R (a)Open access door 436BR (446BR).

(2)Periodic Servicing

(a)Oil brands and types (Ref. GE SB 79-001)

Tabulation of Oils

Notes : (1) Oils marked "X" are "Fully Approved" for service.

(2) Oils marked "XX" are limited to engines currently using these brands.
These brands are not approved for use in other engines or as a new brand.

(3) Oils marked "O" are "Approved for Revenue Service Evaluation".

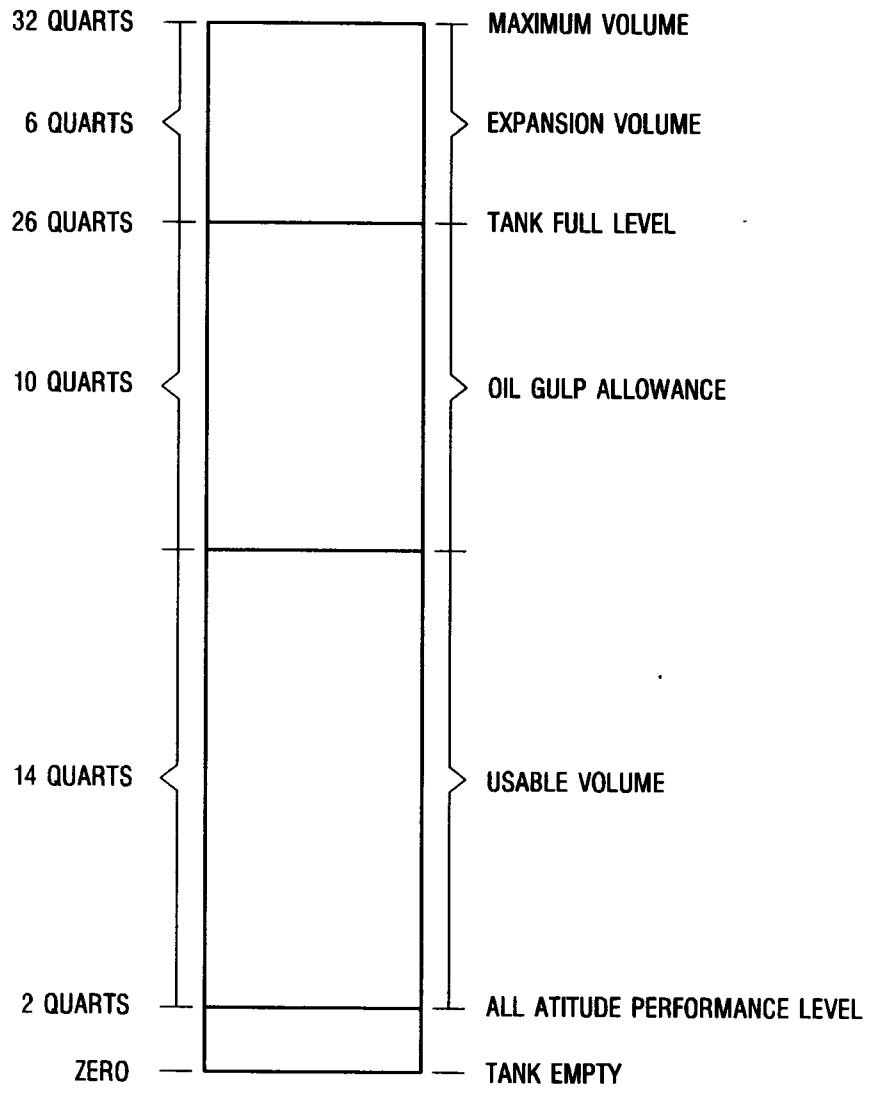
(4) Aeroshell Turbine Oil 555/Royco Turbine Oil 555 are strictly limited to those operators who currently use these brands. It is not approved for use for any operator who chooses a new oil brand. Because of past negative D-sump coking experience when oil has been changed, and the use of AeroShell Turbine Oil 555/Royco Turbine Oil 555, it is recommended that you choose another brand listed on this list if an oil brand change is required. Also, all operators who use AeroShell Turbine Oil 555/Royco Turbine Oil 555 should monitor oil pressure trend reports.

(5) BP Turbo Oil 2197 (formerly Exxon), has full approval for use in revenue service on CF6 engines and has demonstrated a beneficial reduction in the formation of coke deposits. However, deterioration of the Viton O-rings used on the engine oil jets in areas where high soakback temperatures occur has been seen on high time CF6-80C2 engines. There have been no operational problems reported to date that result from this deterioration but GEAE is currently evaluating better O-ring materials for the high temperature area affected. The oil jets in the high temperature areas on the CF6-6 and CF6-50 use gaskets of a different material than the O-rings on the CF6-80A, CF6-80C2, and CF6-80E oil jets.

(6) Operation with Type 1 oils is not recommended below -54°C (-65.2°F).

(7) Type 2 oils are limited to a minimum oil temperature of -40°F (-40°C) for engine starting.

(8) This tabulation will be revised as status changes occur.



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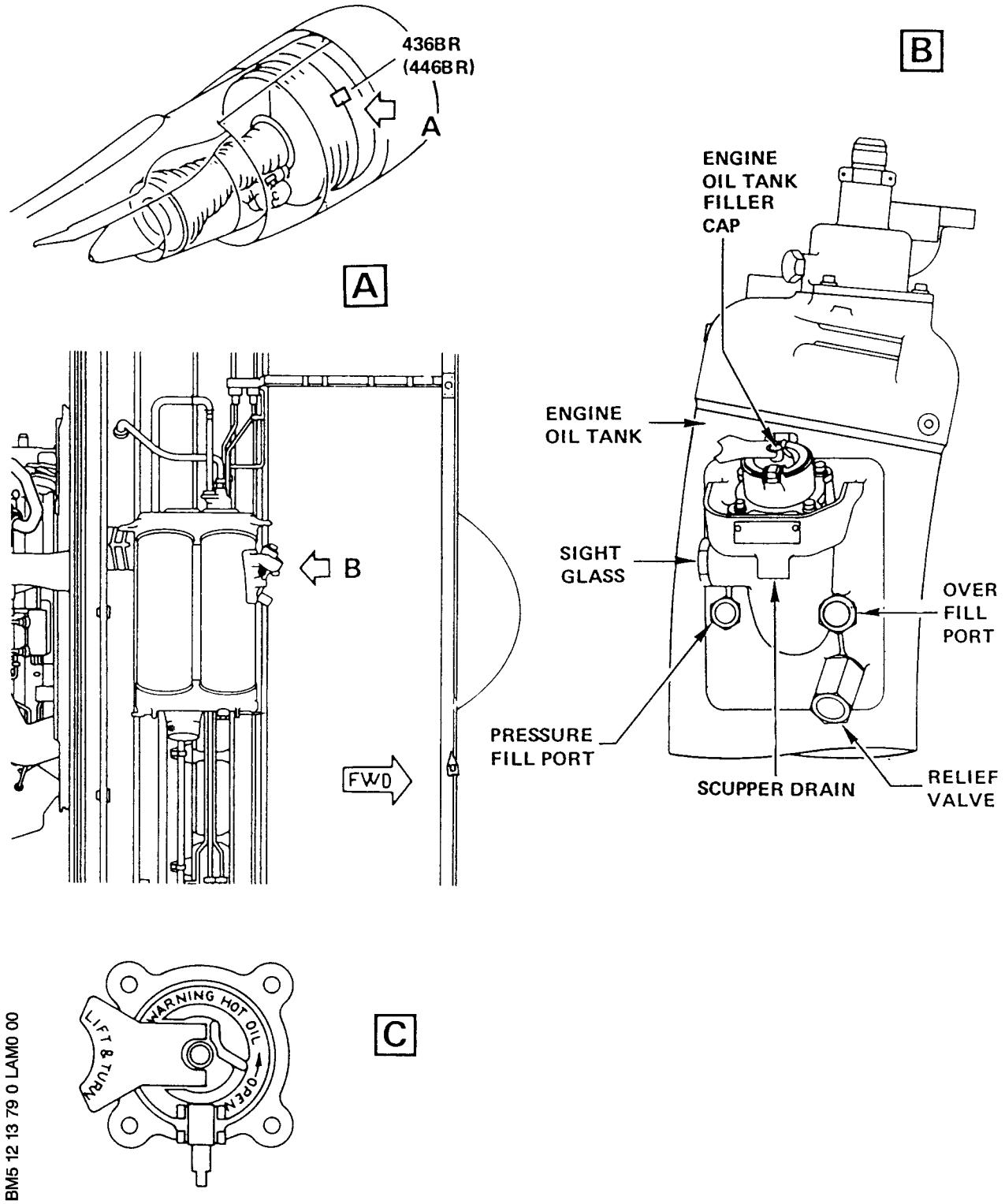
Oil System - Replenishment
Figure 001



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Engine Oil Tank Replenishing
Figure 002

BRAND NAME	OIL TYPE	-80C2
Aeroshell Turbine Oil 500/ Royco Turbine Oil 500	2	X
Aeroshell Turbine Oil 555/ Royco Turbine Oil 555	2	XX
Aeroshell Turbine Oil 560/ Royco Turbine Oil 560	2	X
Castrol 5000	2	X
BP Turbo Oil 2197 (Formerly Exxon)	2	X
BP Turbo Oil 2380 (Formerly Exxon)	2	X
BP Turbo Oil 2389 (Formerly Exxon)	1	0
BP Turbo Oil 25 (Formerly Exxon)	2	X
Mobil Jet Oil II	2	X
Mobil 254	2	X
Mobil 291	2	X

WARNING : SYNTHETIC LUBRICANTS USED IN AIRCRAFT TURBINE ENGINES CONTAIN ADDITIVES WHICH ARE READILY ABSORBED THROUGH THE SKIN AND ARE HIGHLY TOXIC. EXCESSIVE AND/OR PROLONGED EXPOSURE OF THESE LUBRICANTS TO THE SKIN SHOULD BE AVOIDED.

WARNING : WAIT AT LEAST FIVE MINUTES AFTER ENGINE SHUT DOWN BEFORE REMOVING OIL CAP TO ALLOW TANK PRESSURE TO BLEED OFF. HOT OIL GUSHING FROM TANK COULD CAUSE SEVERE BURNS.

CAUTION : IF LUBE SYSTEM IS INADVERTENTLY SERVICED WITH FLUID DISSIMILAR TO SYNTHETIC OIL, SUCH AS MIL-L-6081 OR HYDRAULIC FLUID, THE ENGINE SHOULD NOT BE OPERATED UNTIL THE EFFECTS ON THE ENGINE HAVE BEEN ASSESSED.

(b)Oil system filling (Ref. Fig. 002)

1 Look for possible fuel in the oil system at each oil system servicing. If fuel is in the oil system, it can usually be found by one or more of the indications that follow :

- you smell fuel in the oil
- the oil has a lower viscosity (use a viscometer)

- there is an indication of a combustible gas in the oil tank (use a combustible gas detector).
- the oil tank overflows when the filler cap is opened.

2 If fuel is found in the oil system, do the trouble shooting procedure, refer to TSM 79-00-20 and the oil system flush procedure. (Ref. 79-00-00, P. Block 301).

NOTE : A sight glass is installed below the fill port scupper at a lever approximately 3 quarts (2.8 liters) below full.

3 Do the servicing in 30 minutes or less after engine shut down.

NOTE : Servicing with the same brand of oil that is already in the engine is recommended, but approved oil brands can be mixed if necessary. If you change the brand of oil, refer to SB GE 79-001 for approved oil brands and the oil brand change procedure.

4 Manually fill the engine oil tank.

WARNING : WAIT AT LEAST FIVE MINUTES AFTER ENGINE SHUT-DOWN BEFORE REMOVING OIL CAP TO ALLOW TANK PRESSURE TO BLEED OFF. HOT OIL GUSHING FROM TANK COULD CAUSE SEVERE BURNS.

. Remove oil tank filler cap

CAUTION : DURING MANUAL FILLING, ADD OIL SLOWLY SO THAT FLOW CAPACITY OF THE FILLER NECK IS NOT EXCEEDED.

. Look for possible fuel in the oil system at each oil system servicing. If fuel is in the oil system, it can usually be found by one or more of the indications that follow :
  - you smell fuel in the oil
  - the oil has a lower viscosity (use a viscometer)
  - there is an indication of a combustible gas in the oil tank (use a combustible gas detector).
  - the oil tank overflows when the filler cap is opened.
. If fuel is found in the oil system, do the trouble shooting procedure, refer to trouble shooting manual 79-00-20 and the oil system flush procedure (Ref. 79-00-00, P. Block 301).
. Check relative oil level as indicated by sight glass.

NOTE : The tank is fully serviced only when the ball is at the top of the glass and oil has overflowed at the oil tank filler.

. Add oil until it runs out the neck of the oil tank.

NOTE : Servicing with the same brand of oil that is already in the engine is recommended, but approved oil brands can be mixed if necessary. If you change the brand of oil, refer to SB GE 79-001 for approved oil brands and the oil brand change procedure.

. Install filler cap and check for looseness and positive locking.

5 Pressure fill engine oil tank.

. Connect the engine oil servicing cart line to the pressure fill port.
  Connect a drain hose (line) to the overfill port.
. If a large quantity of oil (0.5 quarts (0.5 liter) or more) flows from the drain hose, fuel or hydraulic fluid can be in the oil tank.
. Slowly pump oil into the oil tank. When the oil begins to flow from the hose connected to the overfill port, do not pump any more oil into the oil tank.

. Disconnect the line from the oil fill port.
. Wait until no more oil flows from the hose connected to the overfill port.
. Disconnect the hose from the overfill port.
. Be careful to replace and secure port caps.

(3)Close-up

1 Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

2 Close access door 436BR (446BR).

WARNING : A MINIMUM OF FIVE MINUTES SHOULD ELAPSE AFTER ENGINE SHUTDOWN BEFORE REMOVING OIL TANK CAP TO ALLOW TANK PRESSURE TO BLEED OFF.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Containers 10 US gallons (38 liters)
C.	Packings
D.	Corrosion Resistant Steel Lockwire (AS3214-02) (Ref. 70-00-00)
E.	Torque Wrench
F.	No. 10 Torq - Set Drive (If applicable)
G. PWA86018	Adapter, Oil Sampler (Optional)
H. Material No.P03-001	Oils (Ref. 70-00-00)
R J. Material No.P06-054	Lubricants (Ref. 70-00-00)
K. Material No.P11-004	Cleaning Agents (Ref. 70-00-00)
Referenced Procedures	
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors
- 72-00-00, P. Block 601	Engine - General
- 79-21-03, P. Block 401	Oil Filter
- 79-22-03, P. Block 401	Magnetic Chip Collectors

2. Drain Engine Oil System

A. Job Set-Up

(1)Open, safety and tag the circuit breakers for the appropriate engine and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(2)Position suitable containers under oil tank, gearbox drain plugs and angle gearbox.

B. Procedure

NOTE : If you see "black oil" in the oil system, refer to inspection for oil contamination (Ref. 72-00-00, P. Block 601). Black oil can be an indication of a serious problem or it can be a condition that requires no maintenance action.

WARNING : A MINIMUM OF FIVE MINUTES SHOULD ELAPSE AFTER ENGINE SHUTDOWN BEFORE REMOVING OIL TANK CAP OR DRAIN PLUGS TO ALLOW TANK PRESSURE TO BLEED OFF.
USE CARE WHEN OPENING OIL TANK CAP OR REMOVING DRAIN PLUGS ON A RECENTLY RUN ENGINE. HOT OIL UNDER PRESSURE COULD BE RELEASED TO CAUSE SEVERE BURNS ON CONTACT WITH EYES OR SKIN :

CAUTION : DO NOT MOTOR THE ENGINE WHEN THE ENGINE OIL IS DRAINED. IF IT IS MOTORED WITHOUT ANY OIL IN THE OIL SYSTEM, DAMAGE TO THE ENGINE CAN OCCUR.

(1)Loosen oil tank cap (Ref. Fig. 001).

(2)Drain oil from oil tank and main gearbox by removing oil tank and main

gearbox magnetic chip collector assemblies (Ref. 79-22-03, P. Block 401).
(3)After removing probes from the valve assemblies clean probes with Material No.P11-004.
(4)Drain oil from angle gearbox per following (Ref. Fig. 002).
(a)Remove the fan exit liner segment (inner rear) that is at 6 o'clock (Ref. 72-23-05, P. Block 401).
(b)Remove bolts, washers and plug on right side of angle gearbox bottom cover. Discard packing.
NOTE : Catch oil in container with a capacity of approximately 10 U.S. gallons (38 liters).
(5)Remove and discard main oil filter. (Ref. 79-21-03, P. Block 401).
(6)Allow engine oil to slow drip from drains for approximately thirty (30) minutes.
(7)Install the plug on the right side of the bottom cover of the angle gearbox (Ref. Fig. 002).
(a)Lubricate a new packing with Material No.P03-001.
(b)Install the packing on the plug.
(c)Install the plug in the cover.
(d)Attach the plug to the cover with two washers and two bolts threads lubricated with Material No.P06-054. TORQUE the bolts to between 62 and 72 lbf.in. (0.70 and 0.81 m.daN).
CAUTION : BE VERY CAREFUL WHEN YOU REMOVE OR INSTALL A LINER SEGMENT. IF THE EDGE OF THE LINER SEGMENT HITS SOMETHING, IT CAN DELAMINATE.
(8)Install the fan exit liner segment (inner rear) that you removed (Ref. 72-23-05, P. Block 401).

C. Close-Up and Test
(1)Install main oil filter (Ref. 79-21-03, P. Block 401).
(2)Install oil tank and main gearbox magnetic chip collector assemblies (Ref. 79-22-03, P. Block 401).
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Close thrust reverser and cowl doors (Ref. 71-13-00, P. Block 301), remove safety clips and tags and close circuit breakers.

3. Fill Engine Oil System

A. Job Set-Up
(1)Drain engine oil system (Ref. Para. 2.)

B. Procedure
NOTE : If you see "black oil" in the oil system, refer to inspection for oil contamination (Ref. 72-00-00, P. Block 601). Black oil can be an indication of a serious problem or it can be a condition that requires no maintenance action.
CAUTION : MAKE CERTAIN THAT THE MAGNETIC CHIP DETECTOR ASSEMBLIES ARE INSTALLED.
R CAUTION : RAPID OIL LOSS COULD LEAD TO OIL IGNITION EVENTS AND/OR MAJOR
R INTERNAL DAMAGE TO THE ENGINE. IF THE CAUSE OR HIGH OIL CONSUMP-
R TION CANNOT BE IDENTIFIED AND CORRECTED, DO NOT RETURN THE ENGINE

R TO SERVICE.
R CAUTION : OIL CONSUMPTION SHOULD BE DETERMINED USING AN APPROXIMATE 40 HOUR
R ROLLING AVERAGE OF ENGINE RUN TIME OR OVER THREE OIL ADDITIONS.
R CAUTION : WHEN THE OIL LEVEL IN THE OIL TANK IS CHECKED, IF MORE THAN SIX
R QUARTS OF OIL ARE REQUIRED TO FILL THE TANK, HIGH OIL CONSUMPTION
R TROUBLESHOOTING MUST BE INITIATED.

(1)Remove the oil tank cap (Ref. Fig. 001, 003)
(a)Lift the handle of the cap.
(b)Turn the handle to OPEN.
(c)Remove the cap.
CAUTION : DO NOT USE THE OIL TANK SIGHT GAGE TO DO A CHECK OF THE OIL LEVEL. YOU MUST LOOK INSIDE THE OIL TANK TO CORRECTLY MEASURE THE OIL.

(2)(Pre SB PW4ENG 79-18 or Post SB PW4ENG 79-47) fill the oil system.
NOTE : The correct oil level is at the top of the filler neck valve.
(a)Add engine oil, Material No.P03-001 as necessary to reach the top of the filler neck valve.
(b)Write down the quantity of oil added.

(3)(Post SB PW4ENG 79-18) fill the oil system.
NOTE : The correct level of oil is at the bottom of the "V" made by the valve of the filler neck valve.
CAUTION : DO NOT USE THE PRESSURE FILL METHOD. THE MANUAL FILL METHOD ONLY IS PERMITTED.
(a)Put engine oil, Material No.P03-001, in the filler neck valve until the level of oil reaches the bottom of the "V".
(b)Write down the quantity of oil added.
CAUTION : DO NOT USE THE OIL TANK SIGHT GAGE TO DO A CHECK OF THE OIL LEVEL. YOU MUST LOOK INSIDE THE OIL TANK TO CORRECTLY MEASURE THE OIL.

(4)Install the oil tank cap :
(a)With the handle at OPEN, align the lugs of the cap with the slots of the filler neck valve.
(b)Install the cap.
(c)Push down on the cap while you turn the handle clockwise to CLOSE.
(d)Push the handle in the recess. This locks the cap.
(e)Make sure that the cap is locked.
1 Try to pull up on the edge of the cap.
2 With your hand, apply pressure to the outer edge of the cap at opposite points.
3 The cap must not move.
4 If necessary, remove the cap and repeat steps (a) through (e).

(5)Close the thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(6)Dry motor the engine until the oil pressure is stable (Ref. 71-00-00, P. Block 501).
(7)Do a check of the oil level from between 15 minutes and two hours after shutdown of the engine.
CAUTION : DO NOT USE THE OIL TANK SIGHT GAGE TO DO A CHECK OF THE OIL LEVEL. YOU MUST LOOK INSIDE THE OIL TANK TO CORRECTLY MEASURE THE OIL.

(8)(Pre SB PW4ENG 79-18 or Post SB PW4ENG 79-47). Do a check of the oil level as follows :

(a)Remove the oil tank cap :
NOTE : The correct oil level is at the top of the filler neck valve.
CAUTION : DO NOT USE THE PRESSURE FILL METHOD. THE MANUAL FILL METHOD ONLY IS PERMITTED.
(b)Add engine oil, Material No.P03-001 as necessary to reach the top of the filler neck valve.
(c)Write down the quantity of oil added.
(9)(Post SB PW4ENG 79-18) Do a check of the oil level as follows :
(a)Remove the oil tank cap.
NOTE : The correct level of oil is at the bottom of the "V" made by the valve of the filler neck valve.
(b)If you DO NOT see oil (the oil is below the bottom of the "V") :
1 With a clean screwdriver, push open the valve of the filler neck.
2 With a strong light, look at the oil.
CAUTION : DO NOT USE THE PRESSURE FILL METHOD. THE MANUAL FILL METHOD ONLY IS PERMITTED.
3 Add engine oil, Material No.P03-001 until the level of oil reaches the bottom of the "V".
4 Write down the quantity of oil added.
(c)If you DO see oil (the oil is above the bottom of the "V").
1 Drain 10 US quarts (9.46 L) of oil from the oil tank by removing and installing the oil tank magnetic chip collector assembly (Ref. 79-22-03, P. Block 401).
NOTE : You can use the PWA86018 adapter to drain the oil from the oil tank as an option to the magnetic chip collector removal.
2 Install the oil tank cap. Refer to step (4).
3 Dry motor the engine. (Ref. 71-00-00, P. Block 501).
4 Do another check of the oil level. Refer to step (8).
CAUTION : DO NOT USE THE OIL TANK SIGHT GAGE TO DO A CHECK OF THE OIL LEVEL. YOU MUST LOOK INSIDE THE OIL TANK TO CORRECTLY MEASURE THE OIL.
(10)Install the oil tank cap.
(a)Examine the packing on the cap. If it is cut or shows deterioration, replace it :
1 Discard the old packing.
2 Apply Engine Oil, Material No.P03-001 to the new packing.
3 Install the packing on the cap.
(b)With the handle at OPEN, align the lugs of the cap with the slots of the filler neck valve.
(c)Install the cap.
(d)Push down on the cap while you turn the handle clockwise to CLOSE.
(e)Push the handle in the recess. This locks the cap.
(f)Make sure that the cap is locked.
1 Try to pull up on the edge of the cap.
2 With your hand, apply pressure to the outer edge of the cap at opposite points.
3 The cap must not move.
4 If necessary, remove the cap and repeat steps (b) through (f).

C. Close-Up
(1)Make certain that working area is clean and clear of tools and

miscellaneous items of equipment.
(2)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301), remove safety clips and tags and close circuit breakers.

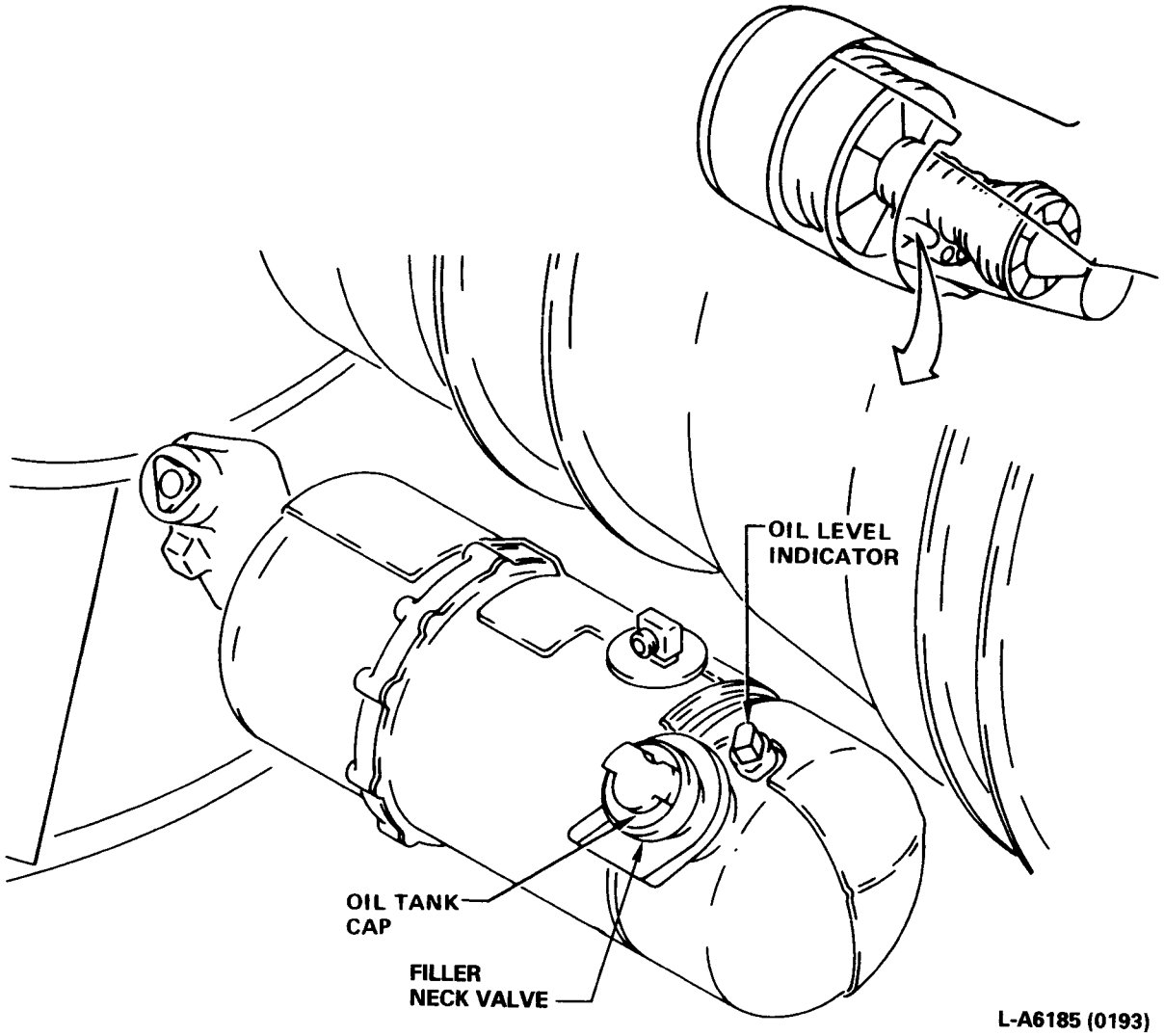
4. Service Engine Oil System

A. When to do a check of the oil level.
(1)Do a check of the oil level from between 15 minutes and two hours after shutdown of the engine.
(2)If engine shutdown occured more than two hours before, you must dry motor the engine until the oil pressure is stable (Ref. 71-00-00, P. Block 501). The dry motor procedure returns to the oil tank any oil that drained from the oil tank. This makes it possible to know if the quantity of oil in the oil tank is correct.

B. Do a check of the oil level.
NOTE : If you see "black oil" in the oil system, refer to inspection for oil contamination (Ref. 72-00-00, P. Block 601). Black oil can be an indication of a serious problem or it can be a condition that requires no maintenance action.
(1)Open the oil-fill-access-door.
WARNING : DO NOT OPEN THE OIL TANK CAP FOR FIVE MINUTES AFTER SHUTDOWN OF THE ENGINE. A MINIMUM OF FIVE MINUTES IS NECESSARY TO LET PRESSURE IN THE OIL TANK BLEED OFF.
WARNING : BE CAREFUL WHEN YOU OPEN THE OIL TANK CAP ON AN ENGINE THAT HAS JUST SHUT DOWN. HOT OIL THAT IS UNDER PRESSURE IS DANGEROUS. IT CAN BADLY BURN EYES AND SKIN.
(2)Remove the oil tank cap (Ref. Fig. 001, 003)
(a)Lift the handle of the cap.
(b)Turn the handle to OPEN.
(c)Remove the cap.
(3)If you notice a damaged or broken oil tank flapper valve during servicing, the following conditions apply.
NOTE : It is permitted to fly with a damaged valve if :
- the flapper valve is replaced at the next visit to a maintenance facility, not to exceed 5 cycles
- the damaged or broken flapper valve does not pose a risk of contamination of the oil system
- the engine is not experiencing oil loss due to oil leakage from the oil tank cap or flapper valve.

CAUTION : DO NOT USE THE OIL TANK SIGHT GAGE TO DO A CHECK OF THE OIL LEVEL. YOU MUST LOOK INSIDE THE OIL TANK TO CORRECTLY MEASURE THE OIL.

(4)(Pre SB PW4ENG 79-18 or Post SB PW4ENG 79-47) add oil as necessary.
NOTE : The correct oil level is at the top of the filler neck valve.
CAUTION : OIL BRAND MIXING IS NOT RECOMMENDED. DAMAGE TO THE ENGINE CAN OCCUR.
(a)Add engine oil, Material NO.P03-001 as necessary to reach the top of the filler neck valve.
NOTE : It is permitted to mix different brands of oil when you service the engine oil system as specified in Service Bulletin No. 238.



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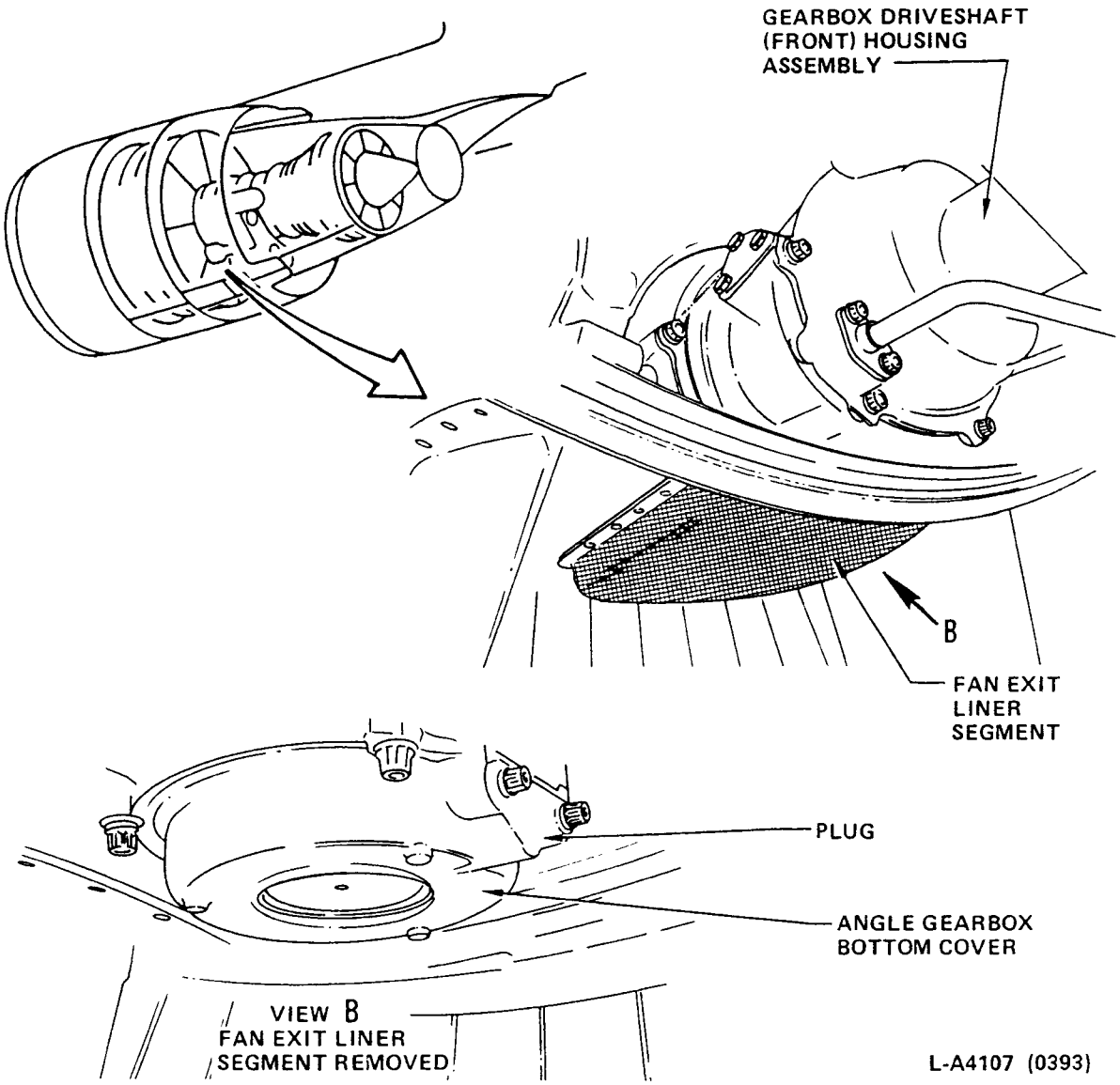
Location of the Oil Tank Cap
Figure 001



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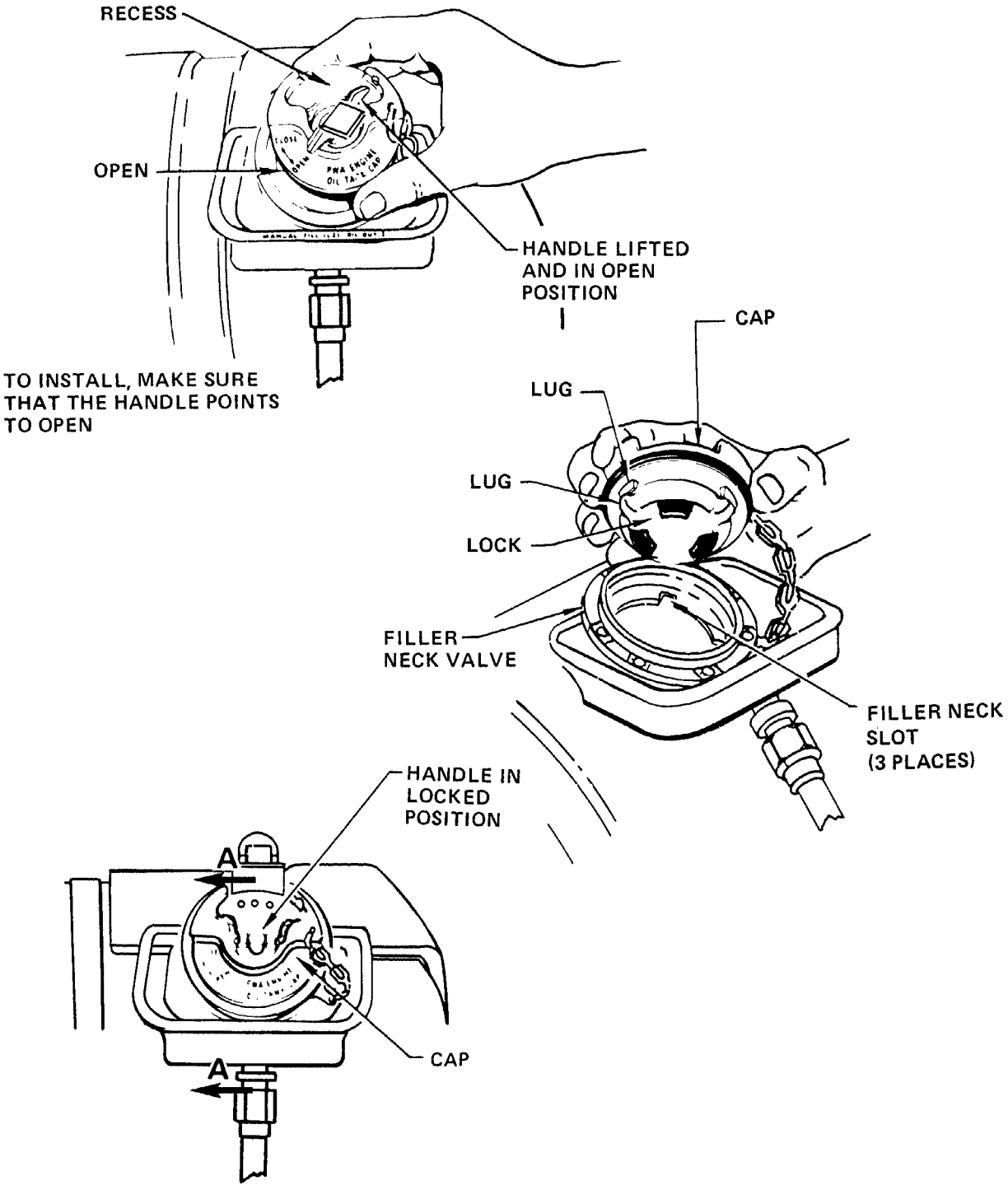
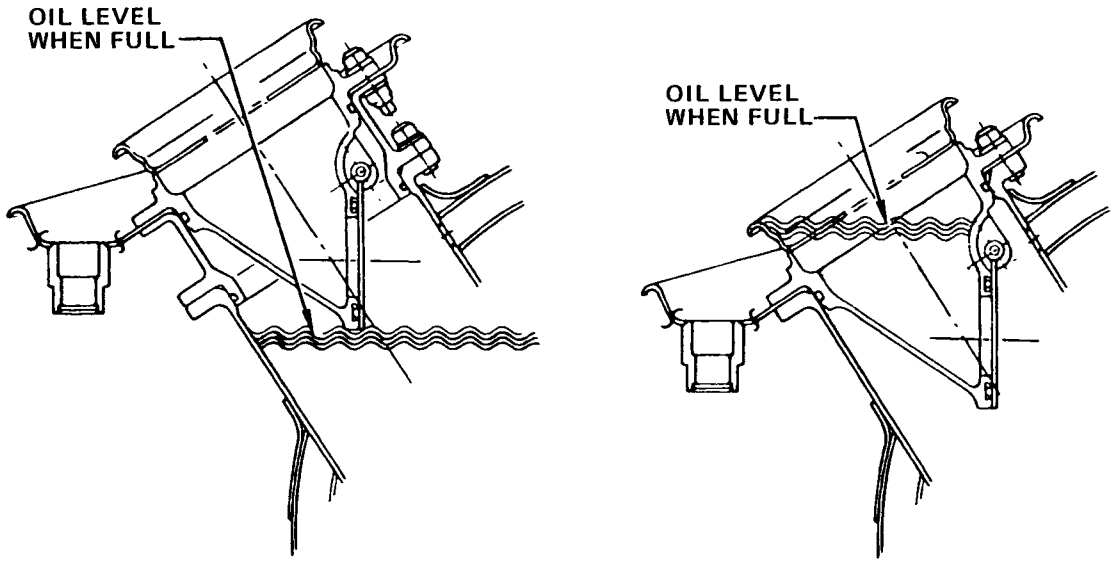
Access to Angle Gearbox Drain Plug
Figure 002



Open/Close the Oil Tank Cap for Correct Oil Level Check (Sheet 1/2)
Figure 003



SECTION A-A
(POST SB PW4ENG 79-18)

SECTION A-A
(PRE SB PW4ENG 79-18 AND
POST SB PW4ENG 79-47)

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Open/Close the Oil Tank Cap for Correct Oil Level Check
(Sheet 2/2)
Figure 003

(b)Write down the quantity of oil added.

(5)(Post SB PW4ENG 79-18) Add oil as necessary.

NOTE: The correct level of oil is at the bottom of the "V" made by the valve of the filler neck valve.

(a)If you DO NOT see oil (the oil is below the bottom of the "V") :

1 With a clean screwdriver, push open the valve of the filler neck.

2 With a strong light, look at the oil.

CAUTION : DO NOT USE THE PRESSURE FILL METHOD. THE MANUAL FILL METHOD ONLY IS PERMITTED.

CAUTION : OIL BRAND MIXING IS NOT RECOMMENDED. DAMAGE TO THE ENGINE CAN OCCUR.

3 Add engine oil, Material No. P03-001 until the level of oil reaches the bottom of the "V".

NOTE : It is permitted to mix different brands of oil when you service the engine oil system as specified in Service Bulletin No. 238.

4 Write down the quantity of oil added.

(b)If you DO see oil (the oil is above the bottom of the "V") :

CAUTION : BE CAREFUL WHEN YOU DRAIN OIL FROM AN ENGINE THAT HAS JUST SHUT DOWN. HOT OIL THAT IS UNDER PRESSURE IS DANGEROUS. IT CAN BADLY BURN EYES AND SKIN.

1 Drain 10US quarts (9.46L) of oil from the oil tank by removing and installing the oil tank magnetic chip collector assembly (Ref. 79-22-03, P. Block 401).

NOTE : You can use the PWA86018 adapter to drain the oil from the oil tank as an option to the magnetic chip collector removal.

2 Install the oil tank cap. Refer to steps (6) (b) through (6) (e).

3 Dry motor the engine. (Ref. 71-00-00, P. Block 501).

WARNING : DO NOT OPEN THE OIL TANK CAP FOR FIVE MINUTES AFTER SHUTDOWN OF THE ENGINE. A MINIMUM OF FIVE MINUTES IS NECESSARY TO LET PRESSURE IN THE OIL TANK BLEED OFF.

WARNING : BE CAREFUL WHEN YOU OPEN THE OIL TANK CAP ON AN ENGINE THAT HAS JUST SHUT DOWN. HOT OIL THAT IS UNDER PRESSURE IS DANGEROUS. IT CAN BADLY BURN EYES AND SKIN.

4 Do another check of the oil level. Refer to step (4).

CAUTION : DO NOT USE THE OIL TANK SIGHT GAGE TO DO A CHECK OF THE OIL LEVEL. YOU MUST LOOK INSIDE THE OIL TANK TO CORRECTLY MEASURE THE OIL.

(6)Install the oil tank cap :

CAUTION : OPERATORS MUST MAKE SURE THE OIL TANK CAP IS SECURELY LATCHED AND IN GOOD WORKING ORDER PRIOR TO OPERATING WITH A DAMAGED OR BROKEN FLAPPER VALVE. IF YOU DO NOT DO THIS, IT WILL CAUSE A POSSIBLE INFLIGHT SHUTDOWN AND POSSIBLE DAMAGE TO THE ENGINE.

(a)Examine the packing on the cap. If it is cut or shows deterioration, replace it :

1 Discard the old packing.

2 Apply engine oil, Material No.P03-001 to the new packing.

3 Install the packing on the cap.

(b)With the handle at OPEN, align the lugs of the cap with the slots of the filler neck valve.

(c)Install the cap.

(d)Push down on the cap while you turn the handle clockwise to CLOSE.

(e)Push the handle in the recess. This locks the cap.
(f)Make certain that the cap is locked.
1 Try to pull up on the edge of the cap.
2 With your hand, apply pressure to the outer edge of the cap at opposite points.
3 The cap must not move.
4 If necessary, remove the cap and repeat step (b) through (f).

C. Close-Up and Test
(1)Make certain that area is clean and clear of tools and miscellaneous items of equipment.
(2)Close oil fill/check access door.

5. Oil System Flush Procedure

A. Job Set-Up
(1)Open, safety and tag the circuit breakers for the appropriate engine and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

B. Procedure
NOTE : If you see "black oil" in the oil system, refer to inspection for oil contamination (Ref. 72-00-00, P. Block 601). Black oil can be an indication of a serious problem or it can be a condition that requires no maintenance action.
WARNING : DO NOT LOOSEN THE OIL TANK CAP OR REMOVE THE MAGNETIC CHIP COLLECTOR ASSEMBLIES FOR FIVE MINUTES, MINIMUM, AFTER ENGINE SHUTDOWN (THIS WILL LET THE PRESSURE IN THE OIL TANK BECOME LOWER). HOT OIL CAN CAUSE BURNS. HOT OIL CAN FLOW FROM THE OIL TANK IF THE PRESSURE IS NOT RELEASED.
BE CAREFUL WHEN YOU WORK WITH THE OIL SYSTEM AND USE SUFFICIENT PROTECTION FOR THE HANDS AND EYES. THE OIL IS HOT AND CAN CAUSE BURNS.
CAUTION : DO NOT MOTOR THE ENGINE WHEN THE ENGINE OIL IS DRAINED. IF IT IS MOTORED WITHOUT ANY OIL IN THE OIL SYSTEM, DAMAGE TO THE ENGINE CAN OCCUR.
(1)Drain the oil that is in the engine oil system as follows.
(a)Loosen the oil tank cap.
R (b)Drain the oil tank.
R (c)Remove the magnetic chip collector assemblies from the oil pump, main gearbox and scavenge oil pump (Ref. 79-22-03, P. Block 401). Clean the probes in Material No.P11-004.
R (d)Tighten the oil tank cap.
R (e)Replace the main oil filter (Ref. 79-21-03, P. Block 401).
R (f)Let engine oil drip from the drains for five minutes.
R (g)Install the magnetic chip collector assemblies (Ref. 79-22-03, P. Block 401).
(2)Fill the oil tank with oil as follows : (Ref. Fig. 001, 003)
(a)Remove the oil tank cap (Ref. 79-11-02, P. Block 401).
CAUTION : DO NOT USE THE OIL LEVEL INDICATOR TO DO A CHECK OF THE OIL LEVEL. YOU MUST LOOK INSIDE THE OIL TANK TO CORRECTLY MEASURE THE OIL.

(b)Fill the oil tank as follows : (Ref. Fig. 003)

1 (Pre SB PW4ENG 79-18 or Post SB PW4ENG 79-47). Put Material No.P03-001 in the filler neck valve until the level of oil reaches the top of the "V".

CAUTION : DO NOT USE THE PRESSURE FILL METHOD. THE MANUAL FILL METHOD ONLY IS PERMITTED.

2 (Post SB PW4ENG 79-18) Put Material No.P03-001 in the filler neck valve until the level of oil reaches the bottom of the "V".

(c)Install the oil tank cap (Ref. 79-11-02, P. Block 401).

(3)Motor the engine as follows :

(a)Close the thrust reverser doors (Ref. 71-13-00, P. Block 301).

(b)Dry motor the engine until the oil pressure is stable (Ref. 71-00-00, P. Block 501).

(4)Drain the oil system again (Ref. Para. (1)).

(5)Fill the oil system (Ref. Para. 3.).

C. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Close thrust reverser and fan cowl doors, remove safety clips and tags and close circuit breakers (Ref. 71-13-00, P. Block 301).

STARTING SYSTEM

1. General

This procedure gives instructions for servicing the pneumatic starter.
No other servicing on line is permitted.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Corrosion Resistant Steel Lockwire
C. Material No.C02-023	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
D. Material No.C04-035	Cleaning Compounds and Solvents (Ref. 70-00-00)
E.	Container 1.0 U.S. quart (graduated - 1 liter)
F.	Torque Wrench, 0-150 lbf.in. (0 - 1.69 m.daN)
G.	Funnel
H.	Pump (Power Source)
Referenced Procedures	
- 70-00-00, P. Block 201	Engine Standard Practices
- 71-13-00, P. Block 301	Cowl Doors
- 80-13-01, P. Block 401	Pneumatic Starter Assy
- 80-13-01, P. Block 601	Pneumatic Starter Assy

3. Procedure

(Ref. Fig. 001)

A. Job Set-Up

(1)Open, safety and tag the appropriate circuit breakers and open the fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

B. Servicing of the Pneumatic Starter

(1)Drain the oil from the starter as follows :

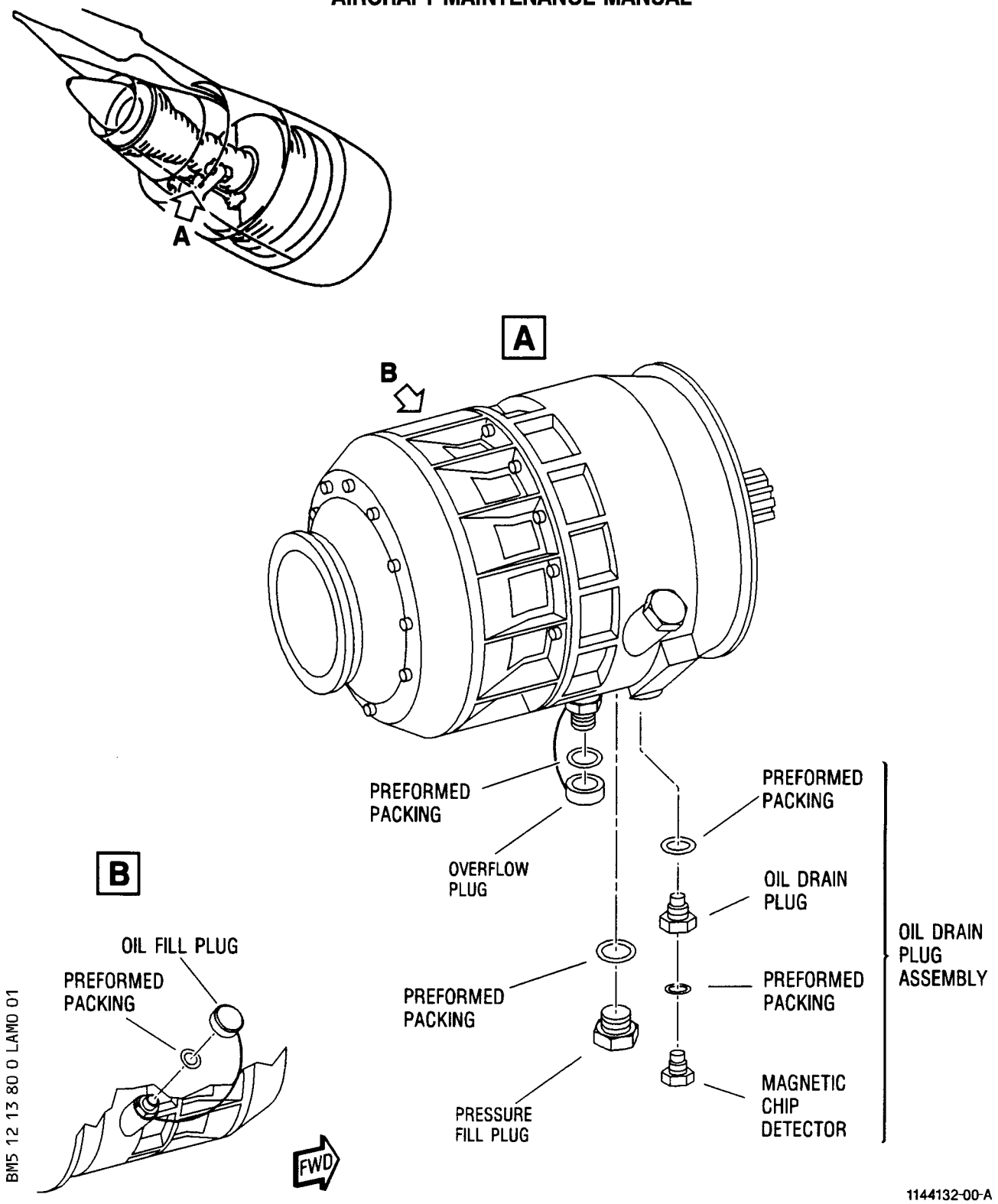
(a)Remove the lockwire from the magnetic oil drain plug assembly located at the 6 o'clock position on the starter.

WARNING : PROLONGED CONTACT WITH OIL LIQUID OR MIST MAY CAUSE DERMATITIS AND IRRITATION. IF THERE IS ANY PROLONGED CONTACT WITH SKIN, WASH AREA WITH SOAP AND WATER. IF OIL CONTACTS EYES, FLUSH EYES WITH WATER IMMEDIATELY. REMOVE SATURATED CLOTHING. IF OIL IS SWALLOWED, DO NOT TRY TO VOMIT. GET IMMEDIATE MEDICAL ATTENTION. WHEN HANDLING LIQUID, WEAR RUBBER GLOVES. IF PROLONGED CONTACT WITH MIST IS LIKELY, WEAR APPROVED RESPIRATOR.

(b)Remove the magnetic oil drain plug assembly from the starter and discard the preformed packing.

CAUTION : REMOVE ALL OIL THAT FALLS ON THE ENGINE PARTS IMMEDIATELY. OIL CAN CAUSE DAMAGE TO PAINT AND SOME RUBBER PARTS.

(c)Drain the oil from the starter into a clean, calibrated container for further analysis.



Pneumatic Starter
Figure 001

(2)Determine if the starter is serviceable as follows :
(a)Examine the quantity of oil drained from the starter in 3.B.(1)(c) above.
R 1 If the oil collected is less than 17 oz. (503 ml), the starter is not serviceable and must be replaced.
R 2 If the oil collected is more than 17 oz. (503 ml), the starter is serviceable.
(b)Examine the magnetic chip detector part of the magnetic oil drain plug assembly for metal particles.
1 Separate the magnetic chip detector part from the magnetic oil drain plug assembly and discard the preformed packing.
2 Examine the magnetic chip detector for metal particles (Ref. 80-13-01, P. Block 601).
(c)Examine the oil drained from the starter for metal particles (Ref. 80-13-01, P. Block 601).
(3)Fill the starter with Material No.C02-023 as follows :
(a)Clean the oil drain plug and the magnetic chip detector with a clean cloth and Material No.C04-035.
(b)Lightly coat new preformed packing with Material No.C02-023 and install on the oil drain plug and the magnetic chip detector.
(c)Install the oil drain plug into the oil drain port of the starter and TORQUE the oil drain plug to between 70 and 80 lbf.in. (0.79 and 0.90 m.daN).
(d)Install the magnetic chip detector into the oil drain plug and TORQUE to between 20 and 40 lbf.in. (0.23 and 0.45 m.daN). Wirelock oil drain plug assembly.
(e)Remove the overflow plug by pushing in and turning counterclockwise. Discard the preformed packing.
(f)Pressure fill the starter as follows :
1 Remove the lockwire from the pressure fill plug located at the 6 o'clock position on the starter and remove the plug. Discard the preformed packing.

WARNING : PROLONGED CONTACT WITH OIL LIQUID OR MIST MAY CAUSE DERMATITIS AND IRRITATION. IF THERE IS ANY PROLONGED CONTACT WITH SKIN, WASH AREA WITH SOAP AND WATER. IF OIL CONTACTS EYES, FLUSH EYES WITH WATER IMMEDIATELY. REMOVE SATURATED CLOTHING. IF OIL IS SWALLOWED, DO NOT TRY TO VOMIT. GET IMMEDIATE MEDICAL ATTENTION. WHEN HANDLING LIQUID, WEAR RUBBER GLOVES. IF PROLONGED CONTACT WITH MIST IS LIKELY, WEAR APPROVED RESPIRATOR.

CAUTION : DO NOT MIX OIL OF DIFFERENT TYPES AND BRAND NAMES AS SOME OILS WILL CHEMICALLY CHANGE WHEN YOU MIX THEM. THIS CAN CAUSE DAMAGE TO THE STARTER. DO NOT FILL THE STARTER WITH MORE THAN SPECIFIED QUANTITY. THIS CAN CAUSE DAMAGE TO THE STARTER.

2 Connect the oil supply and pump (power source) to the pressure fill port on the starter.
3 Fill the starter until oil begins to flow from the overflow port. The capacity of the starter is approximately 27 oz. (798 ml).
4 Clean the overflow plug and pressure fill plug with a clean cloth and Material No.C04-035.

5 Lightly coat new preformed packings with Material No.C02-023 and install on the overflow plug and the pressure fill plug.

6 Install the pressure fill plug into the pressure fill port of the starter and TORQUE to between 70 and 80 lbf.in. (0.79 and 0.90 m.daN). Wirelock the pressure fill plug.

7 Install the overflow plug into the overflow port of the starter. Push in and turn clockwise to lock.

(g)Gravity fill the starter as follows :

1 Remove the oil fill plug by pushing in and turning counterclockwise. Discard the preformed packing.

WARNING : PROLONGED CONTACT WITH OIL LIQUID OR MIST MAY CAUSE DERMATITIS AND IRRITATION. IF THERE IS ANY PROLONGED CONTACT WITH SKIN, WASH AREA WITH SOAP AND WATER. IF OIL CONTACTS EYES, FLUSH EYES WITH WATER IMMEDIATELY. REMOVE SATURATED CLOTHING. IF OIL IS SWALLOWED, DO NOT TRY TO VOMIT. GET IMMEDIATE MEDICAL ATTENTION. WHEN HANDLING LIQUID, WEAR RUBBER GLOVES. IF PROLONGED CONTACT WITH MIST IS LIKELY, WEAR APPROVED RESPIRATOR.

CAUTION : DO NOT MIX OIL OF DIFFERENT TYPES AND BRAND NAMES AS SOME OILS WILL CHEMICALLY CHANGE WHEN YOU MIX THEM. THIS CAN CAUSE DAMAGE TO THE STARTER. DO NOT FILL THE STARTER WITH MORE THAN SPECIFIED QUANTITY. THIS CAN CAUSE DAMAGE TO THE STARTER.

2 Put a funnel in the oil fill port of the starter and fill the starter until oil begins to flow from the overflow port. The oil capacity of the starter is approximately 27 oz. (798 ml).

3 Clean the overflow plug and the oil fill plug with a clean cloth and Material No.C04-035.

4 Lightly coat new preformed packings with Material No.C02-023 and install them on the overflow plug and the oil fill plug.

5 Install the overflow plug into the port of the starter. Push in and turn clockwise to lock.

6 Install the oil fill plug into the oil fill plug port of the starter. Push in and turn clockwise to lock.

1. General

A. This procedure provides instructions for replenishment of pneumatic starter oil supply in gravity fill configuration or pressure fill configuration and pneumatic starter oil change.

B. Access to the starter is through the right thrust reverser door.

2. Equipment and Materials

ITEM	DESIGNATION
A. Material No.P03-001	Oils (Ref. 70-00-00)
B.	Packing
C.	Corrosion Resistant Steel Lockwire (MS-20995C20) (Ref. 70-00-00)
D.	Hand Oil Pump with Hose and Pressure Fitting
E.	Overflow Hose with Pressure Fitting
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 70-00-00, P. Block 201	Engine - Standard Practices
- 80-13-01, P. Block 601	Pneumatic Starter Assembly

3. Replenish Pneumatic Starter Oil Supply (Gravity Fill Configuration) (Ref. Fig. 001)

A. Open, safety and tag circuit breaker for the appropriate engine and open right thrust reverser door (Ref. 71-13-00, P. Block 301).
WARNING : LUBRICATING OILS CONTAIN ADDITIVES WHICH ARE READILY ABSORBED THROUGH THE SKIN AND ARE CONSIDERED TOXIC. AVOID PROLONGED OR CONTINUOUS CONTACT OF LUBRICATING OIL WITH SKIN.

B. Remove lockwire, cap and packing from gravity fill port (either side of starter), and lockwire, cap, and packing from overflow port at bottom of starter. Fill starter with Material No.P03-001 until oil flows from overflow port at bottom of starter. Discontinue servicing of starter with oil and wait until oil flow from overflow port is reduced to drops.

NOTE : (Pre SB PW4NAC 80-9) Starter oil capacity is approximately 10 ounces (300 ml). After servicing starter with oil, verify oil level using sight glass. Sight glass oil level should be at least half full after starter is fully serviced with oil.

NOTE : (Post SB PW4NAC 80-9) Starter oil capacity is approximately 12 ounces (360 ml). Post SB PW4NAC 80-9 starters do not have a sight glass to verify oil level. When a level of 12 ounces of oil has been reached, lubricating oil will flow from the starter's oil overflow port. Ensure the overflow port is uncapped.

R CAUTION : OVERFILLING OR UNDERFILLING OF THE PNEUMATIC STARTER WITH OIL
R COULD RESULT IN PREMATURE DAMAGE AND MALFUNCTION OF THE STARTER.
R VERIFY THE OIL LEVEL AT HALF FULL AS A MINIMUM USING THE SIGHT
R GLASS (THIS DOES NOT APPLY TO THE POST SB PW4NAC 80-9 STARTER,
R PN774860-A4, WHICH DOES NOT HAVE A SIGHT GLASS.

R C. Install gravity fill port cap with packing. TORQUE fill cap to between
R 20 and 35 lbf.in. (0.22 and 0.40 m.daN). Wirelock using 0.020 in. (0.5 mm)
R corrosion-resistant steel lockwire.

R D. Install overflow port cap with packing. TORQUE overflow cap to between
R 10 and 25 lbf.in. (0.11 and 0.30 m.daN). Wirelock cap using 0.020 in.
R (0.5 mm) corrosion-resistant steel lockwire.

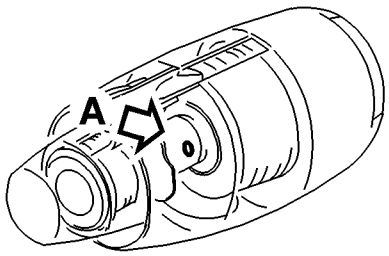
R E. Close thrust reverser and fan cowl doors. Remove safety clips and tags and
close circuit breakers. (Ref. 71-13-00, P. Block 301).

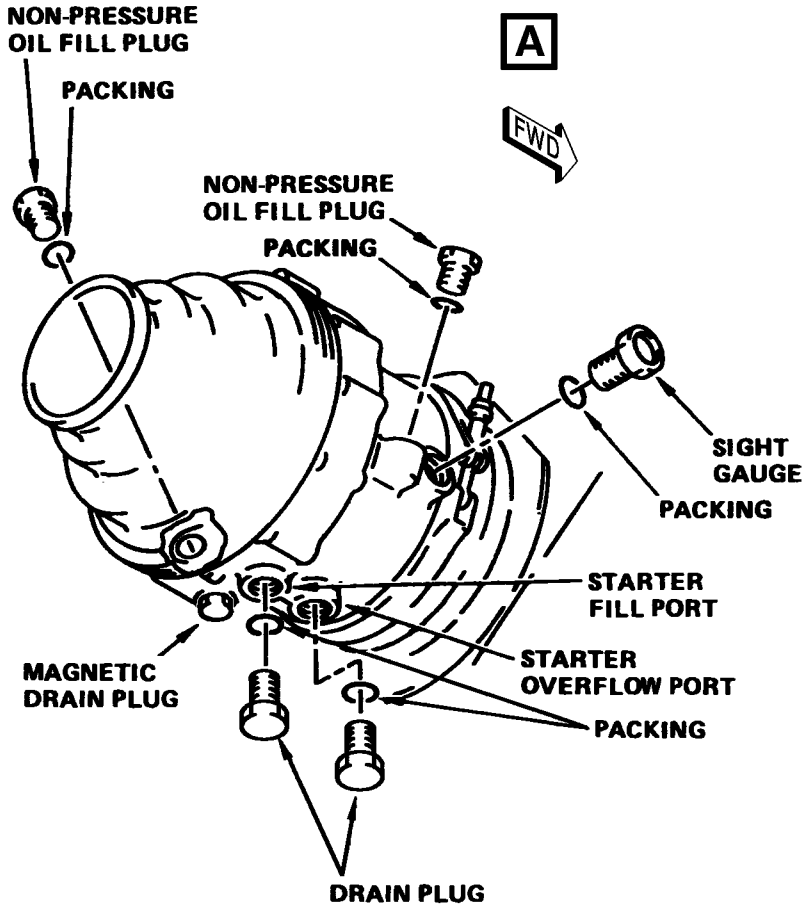
R 4. Replenish Pneumatic Starter Oil Supply (Pressure Fill Configuration)
R (Ref. Fig. 002)
R NOTE : This procedure is only available for aircraft equipped with overflow
R and pressure fill adapter.

R A. Open, safety and tag circuit breaker for the appropriate engine and open
R right thrust reverser door (Ref. 71-13-00, P. Block 301).
R WARNING : LUBRICATING OILS CONTAIN ADDITIVES WHICH ARE READILY ABSORBED
R THROUGH THE SKIN AND ARE CONSIDERED TOXIC. AVOID PROLONGED OR
R CONTINUOUS CONTACT OF LUBRICATING OIL WITH SKIN.
R
R B. Remove both overflow and pressure fill adapter dust covers from bottom
R of starter. Connect pressure fill hose and overflow drain hose. Fill
R starter with Material No.P03-001 until oil flows from overflow port drain
R hose. Discontinue servicing of starter with oil and wait until oil flow
R from overflow port drain hose is reduced to drops.
R NOTE : (Pre SB PW4NAC 80-9) Starter oil capacity is approximately 10 ounces
R (300 ml). After servicing starter with oil, verify oil level using
R sight glass. Sight glass oil level should be at least half full
R after starter is fully serviced with oil.
R NOTE : (Post SB PW4NAC 80-9) Starter oil capacity is approximately
R 12 ounces (360 ml). Post SB PW4NAC 80-9 starters do not have a sight
R glass to verify oil level. When a level of 12 ounces of oil has been
R reached, lubricating oil will flow from the starter's oil overflow
R port. Ensure the overflow port is uncapped.

R C. Disconnect pressure fill hose and install adapter cover.
R CAUTION : OVERFILLING OR UNDERFILLING OF THE PNEUMATIC STARTER WITH OIL
R COULD RESULT IN PREMATURE DAMAGE AND MALFUNCTION OF THE STARTER.
R VERIFY THE OIL LEVEL AT HALF FULL AS A MINIMUM USING THE SIGHT
R GLASS (THIS DOES NOT APPLY TO THE POST SB PW4NAC 80-9 STARTER,
R PN774860-A4, WHICH DOES NOT HAVE A SIGHT GLASS.

R D. After overflow drain has completely stopped dripping, check correct oil





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Pneumatic Starter Oil Replenishment (Gravity Fill Configuration)
Figure 001

R

R level using sight glass. Sight glass oil level must be at least
R half-full after pneumatic starter is fully serviced with oil.
R
R E. Disconnect overflow drain hose and install adapter cover.

R F. Close thrust reverser and fan cowl doors. Remove safety clips and tags and
R close circuit breakers. (Ref. 71-13-00, P. Block 301).

R 5. Change Starter Oil (Ref. Fig. 002)

A. Open, safety and tag circuit breaker for the appropriate engine, and open left fan and thrust reverser doors. (Ref. 71-13-00, P. Block 301).

B. Remove and inspect magnetic plug (Ref. 80-13-01, P. Block 601).

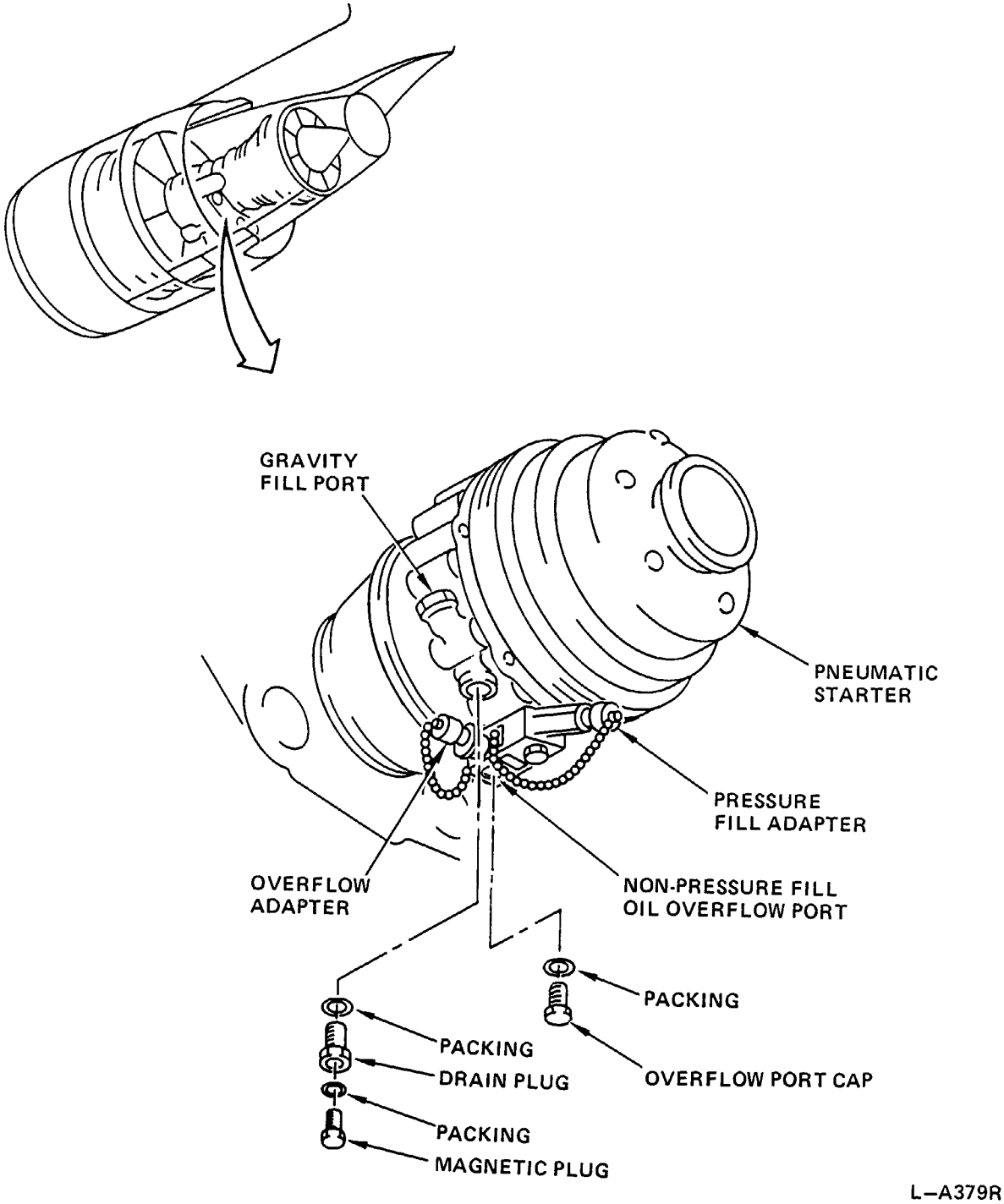
C. Remove drain plug and drain oil into a calibrated container.

D. If less than approximately 7 ounces (207 ml) of oil is obtained from draining, starter is not serviceable and should be replaced.

E. Replace drain plug.
(1)Lubricate new packing and threads of drain plug with Material No.P03-001.
(2)Install packing on drain plug, and install drain plug in starter.
(3)TORQUE drain plug, 0.75 in. (19.05 mm) hex head, to between 10 and 25 lbf.in. (0.11 and 0.28 m.daN).
(4)Safety drain plug to transmission housing using 0.020 in. (0.5 mm) corrosion-resistant steel lockwire.

F. Replenish pneumatic starter oil supply . (Ref. Para. 3.).

G. Close thrust reverser and fan cowl doors. Remove safety clips and tags and close circuit breakers. (Ref. 71-13-00, P. Block 301).



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Pneumatic Starter Oil Replenishment
Figure 002

R

1. General

This section deals with the various operations concerning replenishment of air, oxygen, etc... for the various aircraft services.

12-14-29 Hydraulic System Accumulators

12-14-32 Landing Gear

R **ON A/C 105-200,

12-14-35 Oxygen

HYDRAULIC SYSTEM ACCUMULATORS

CAUTION : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING THE HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

NOTE : The nitrogen charging procedures described in this topic apply to the accumulator of each system (Green 1070, Blue 2070 and Yellow 3070, 3125, 3126).

1. Reason for the Job

To charge accumulator with nitrogen to obtain correct pressure.

2. Equipment and Materials

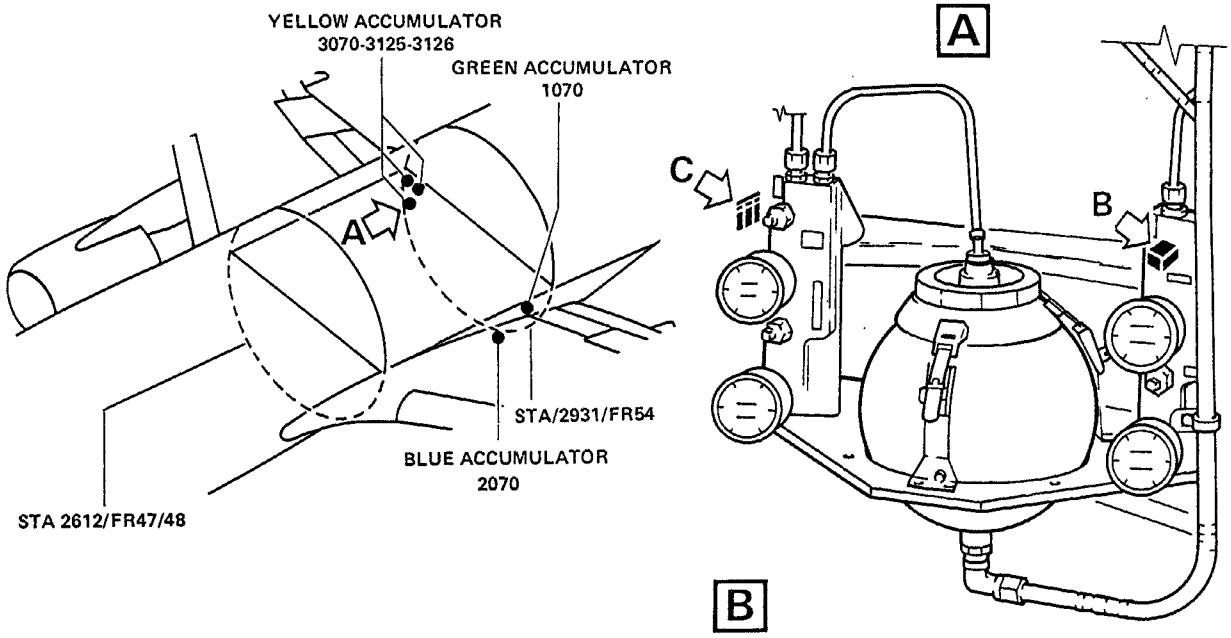
ITEM	DESIGNATION
A.	Access Platform, 2.6 m (8 ft. 6 in.)
B.	Air/Hydraulic Tool Kit
C.	Nitrogen Cylinder
Referenced Procedures	
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

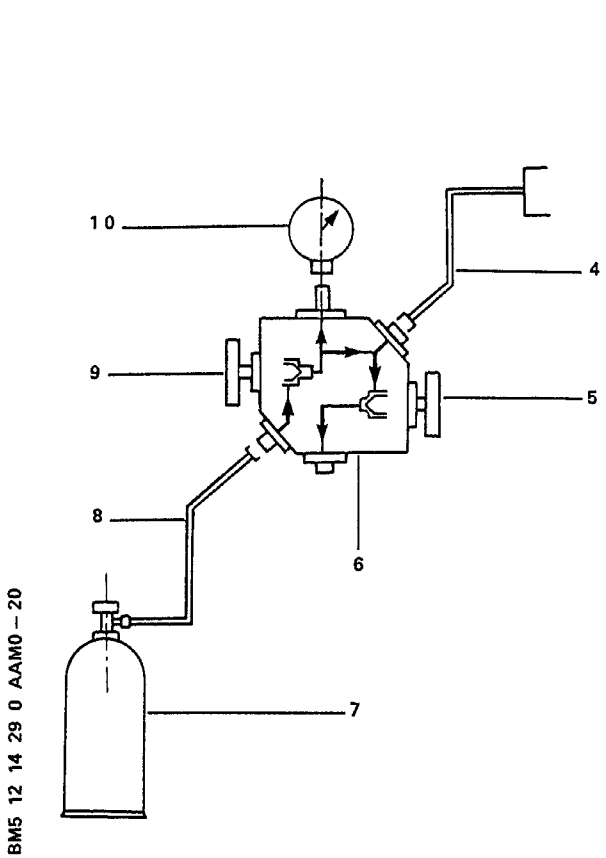
3. Procedure

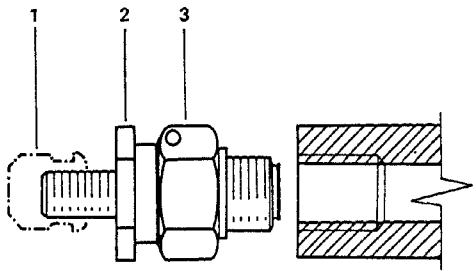
(Ref. Fig. 001)

A. Job Set-Up
(1)Open right main landing gear door (Ref. 32-12-11, P. Block 301).
(2)Depressurize reservoir of associated system. Depressurization equipment must remain connected to connector 1005 (2005) (3005) (Ref. 29-14-00, P. Block 301).
(3)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Display warning notices on ground connectors of relevant system, and on panel 427VU, prohibiting system pressurization.

B. Charging of Accumulator
(1)Unscrew protective cap (1) from nitrogen charging valve (3).
(2)Unscrew nut (2) one and a half turns.
(3)Connect an HP hose (8) between nitrogen cylinder (7) and 3-way valve (6)
(4)Install a pressure gage (10) calibrated from 0 to 2176 psi (0 - 150 bars) on 3-way valve (6).
(5)Open valves (5) and (9) as well as nitrogen cylinder, in order to vent system.
(6)Close valves (5) and (9).







NITROGEN PRESSURE		
°C	BARS	PSI
– 20	86	1247
– 10	90	1305
0	93	1349
+ 10	97	1407
+ 20	100	1450
+ 30	104	1508
+ 40	107	1552
+ 60	114	1653

Nitrogen Charging of Hydraulic Accumulators
Figure 001

(7)Connect HP hose (4) to charging valve (3).
(8)Slowly open valve (9) and stabilize final pressure at value corresponding to ambient temperature, as shown in correction chart. Close valve (9).
(9)Tighten nut (2) on charging valve (3); make certain that pressure gage (10) indicates correct pressure.
(10)Disconnect HP hose (4) from charging valve (3).
(11)Open valve (5) in order to vent system (pressure gage (10) indicates zero).
(12)Close nitrogen cylinder (7) and open valve (9) of 3-way valve (6) in order to vent system.

R C. Close-Up
R (1)Check charging valve (3) for leakage.
R (2)Install protective cap (1).
R (3)Pressurize reservoir of corresponding system (Ref. 29-14-00, P. Block 301).
R (4)Remove warning notice.
R (5)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.
R (6)Remove access platform.
R (7)Close right main landing gear door (Ref. 32-12-11, P. Block 301).

1. Tire Inflation

WARNING : ALWAYS USE ONLY NITROGEN FOR MAIN WHEEL TIRE INFLATION SO THAT THE GAS MIXTURE IN THE TIRE DOES NOT EXCEED 5 PERCENT OF OXYGEN BY VOLUME. THE USE OF AIR OR OTHER GASES COMMONLY USED ON AIRCRAFT SERVICING IS STRICTLY PROHIBITED DUE TO THE DANGER OF EXPLOSIVE FAILURE OF THE WHEEL/TIRE ASSEMBLY AS A RESULT OF BRAKE OVERHEAT. AIR MAY BE USED ONLY TO INFLATE NOSE WHEEL TIRES WHICH ARE NOT BRAKED AT LANDING ROLL.

R WARNING : BE CAREFUL WHEN YOU INFLATE THE TIRES. USE A PRESSURE REGULATOR
R (OR PRESSURE RELIEF VALVE) BETWEEN THE PRESSURE SOURCE AND THE
R TIRE. MAKE SURE THAT THE PRESSURE REGULATOR IS ADJUSTED TO THE
R CORRECT PRESSURE FOR THE TIRE. IF THE SOURCE DOES NOT HAVE A
R PRESSURE REGULATOR, THERE IS A RISK OF INJURY TO PERSONS AND/OR
R DAMAGE TO EQUIPMENT.

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Runway Tire Inflating Cart (Nitrogen)
(2)A0103340	Tire Inflation Adaptor
(3)	Pressure Gage

B. Procedure

(1)Job set-up

NOTE : Tires on braked wheels may be replenished with air at remote locations where dry nitrogen is not available, provided that :
- the oxygen content does not exceed 5 percent by volume,
or :
- within the next 15 hour time-in-service the tire must be purged of air and inflated with dry nitrogen so that the oxygen does not exceed 5 percent by volume.

(a)Set up the tire inflating cart near the tire to be inflated.

(b)Remove tire inflating valve cap.

(c)Connect inflating cart hose, fitted with tire inflation adaptor P/N A0103340 and pressure gage, to tire inflating valve.

(2)Tire inflating nominal pressure (PN)

NOTE : The pressure of the tires decreases during normal operation. To keep the frequency of tire servicing operations to a minimum (daily), we recommend that you inflate the tires to MAX of NOR (PN + 5 %).

NOTE : If for any reason, it is necessary to reinflate a hot tire, the pressure reading will be higher than the nominal pressure value but should be within a same range.
In such a case, we recommend you proceed as follows :
- Record the pressure of all the tires.
- Note the maximum pressure value of any tire.
- Any tire with a pressure 10 per cent below this maximum noted

pressure value has to be re-inflated at this maximum value.
- Record it in the logbook.

WARNING : DO NOT REDUCE PRESSURE OF A HOT TIRE. THE RECORD OF THE INFLATION PRESSURE FOR COMPARISON PURPOSE HAS TO BE MADE AT LEAST ON TIRES INSTALLED ON A SAME LANDING GEAR.

NOTE : If there is a large temperature decrease between the departure and the destination airports, the tire pressures given must be adjusted. If the temperature difference is equal to or greater than 25 deg.C (45 deg.F) lower, do this procedure :
- Increase the given tire pressures 3.7 % for each 10 deg.C (18 deg.F) of temperature difference.

EXAMPLE : Temperature at departure airport = 20 deg.C (68 deg.F)
Temperature at arrival airport =-10 deg.C (14 deg.F)
Temperature difference = 30 deg.C (54 deg.F)

Increase the tire pressure : 30/10 x 3.7 % = 11.1 %
If the loaded tire pressure is 13.0 bar (188.67 psi), increase the tire pressure :
13.0 bar (188.67 psi) x 11.1 % = 14.4 bar (208.99 psi)

	M.T.O.W	A/C TYPE	TIRE	A/C ON JACKS		A/C ON WHEELS	
				BARS	PSI	BARS	PSI
	125 t 275580 lb	A310-200	NLG : (40X14)	9.3	135	9.7	141
			(40X14R16)	9.3	135	9.7	141
		A310-200	MLG : (46X16)	11.3	164	11.7	170
			(46X17R20)	11.3	164	11.7	170
	132 t 291010 lb	A310-200	NLG : (40X14)	9.6	139	10	145
			(40X14R16)	9.6	139	10	145
		A310-200	MLG : (46X16)	11.9	172	12.3	178
R			(49X17)	9.9	143	10.2	148
	135 t 297624 lb	A310-200	NLG : (40X14)	9.6	139	10	145
			(40X14R16)	9.6	139	10	145
		A310-300	NLG : (40X14)	10.8	157	11.3	164
			(40X14R16)	10.8	157	11.3	164
		A310-200	MLG : (46X16)	11.9	172	12.3	178
			(46X17R20)	11.9	172	12.3	178
		A310-300	MLG (49X17)	11	159	11.4	165
R	138.6 t 305560 lb	A310-200	NLG : (40X14)	9.9	143	10.3	149
R			(40X14R16)	9.9	143	10.3	149

M.T.O.W	A/C TYPE	TIRE	A/C ON JACKS		A/C ON WHEELS	
			BARS	PSI	BARS	PSI
	A310-300	NLG : (40X14)	10.8	157	11.3	164
		(40X14R16)	10.8	157	11.3	164
	A310-200	MLG : (46X16)	12.5	181	13	188
		(49X17)	10.4	151	10.8	157
		(46X17R20)	12.5	181	13	188
	A310-300	MLG : (46X16)	12.7	184	13.2	191
		(49X17)	10.5	152	11	160
		(46X17R20)	12.7	184	13.2	191
142 t 313056 lb	A310-200	NLG : (40X14)	10.6	154	11	160
		(40X14R16)	10.6	154	11	160
	A310-200	MLG : (46X16)	12.8	185	13.3	193
		(49X17)	10.6	154	11	160
		(46X17R20)	12.8	185	13.3	193
144 t 317465 lb	A310-200	NLG : (40X14)	10.6	154	11	160
		(40X14R16)	10.6	154	11	160
	A310-200	MLG : (46X16)	12.8	185	13.3	193
150 t 330693 lb	A310-300	NLG : (40X14)	10.8	157	11.3	164
		(40X14R16)	10.8	157	11.3	164
	A310-300	MLG : (46X16)	13.7	199	14.3	207
		(49X17)	11.4	165	11.9	173
		(46X17R20)	13.7	199	14.3	207
153 t 337307 lb	A310-300	NLG : (40X14)	10.8	157	11.3	164
		(40X14R16)	10.8	157	11.3	164
	A310-300	MLG : (46X16)	14	203	14.6	212
		(49X17)	11.6	168	12	174
		(46X17R20)	14	203	14.6	212
157 t 346125 lb	A310-300	NLG : (40X14/24PR)	10.8	157	11.3	164
		(40X14R16)	10.8	157	11.3	164
		(40X14R16-P/N M11701)	11.8	171	12.3	178

M.T.O.W	A/C TYPE	TIRE	A/C ON JACKS		A/C ON WHEELS	
			BARS	PSI	BARS	PSI
	A310-300	MLG : (46X16)	14.3	207	14.8	215
		(49X17)	11.9	172	12.4	180
		(46X17R20)	14.3	207	14.8	215
160 t 352739 lb	A310-300	NLG : (40X14)	10.8	157	11.3	164
		(40X14R16)	10.8	157	11.3	164
	A310-300	MLG : (49X17)	12.4	180	12.6	183
164 t 361558 lb	A310-308	NLG : (40X14)	10.8	157	11.3	164
	A310-308	MLG : (49X17)	12.4	180	12.9	187

(3)Tire inflating pressure for training
(a)When the aircraft is operated continuously at low MTOW for pilot training programs and only for training, MLG tire pressure may be adjusted using the following rule :

$$P_{training} = \frac{MTOW_{training}}{MTOW_{nominal}} \times P_{Nominal}$$

No change for NLG tire pressure.

C. Close-Up
(1)Disconnect inflating cart hose.
(2)Install tire inflating valve cap.
(3)Remove inflating cart.

R 2. Criteria for Tire Utilization Limits (Ref. 32-41-00)
R

3. Charging of Main Landing Gear Shock Absorbers (Ref. 12-12-32)

4. Charging of Pitch Dampers (Ref. 12-12-32)

5. Charging of Nose Gear Shock Absorber (Ref. 12-12-32)

6. Brake Power Accumulator (3125 - 3126) Charging

A. Reason for the Job
(1)Brake power accumulator charging.

B. Equipment and Materials

ITEM	DESIGNATION
(1)97A29102035000	Connector-Pressurization, Hydraulic Tank
(2)97A29102062000	Connector-Depressurizing, Hydraulic Tank
(3)	Air/Hydraulic Tool Kit
(4)	Nitrogen Cylinder
(5)	Circuit Breaker Safety Clips
(6)	Warning Notices
(7)	Safety Barriers
(8)	Access Platform 2.60 m (8 ft. 7 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir - Pressurization/ Depressurization
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure

(Ref. Fig. 001)

(1)Job Set-Up

(a)On panel 4VU

- make certain that landing gear control lever is in **DOWN** position and prohibit its operation by displaying a warning notice.

NOTE : A waiting time of ten minutes is needed before reading the gauges and after the manual depressurization by means of the brake relief valve 3067.
Moreover, if the check is performed just after landing, a waiting time of 1 hour makes the measurement more accurate because of the temperature compensation of the accumulator.

(b)Between First Officer's and Third Occupant's seats

- make certain that Landing gear Free Fall extension control is in normal position.

(c)Open safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	HYDRAULIC/ELEC/PUMPS/WARN	4GE	331/V60
133VU	HYDRAULIC/ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(d)Position access platform.

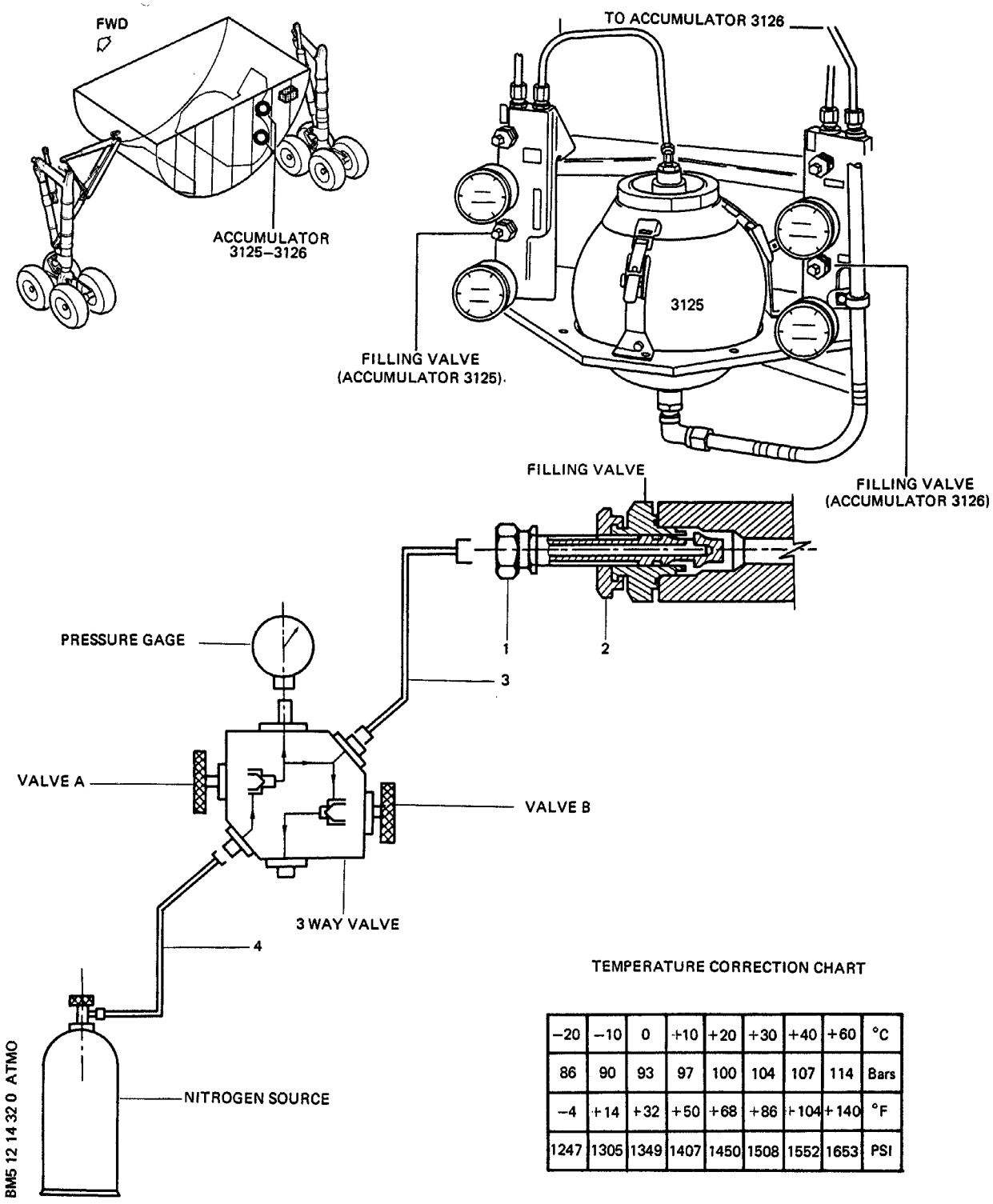
(e)Position safety barriers prohibiting access to gear door travel ranges.

WARNING : MAKE CERTAIN THAT THE DOOR TRAVEL RANGES ARE CLEAR.

(f)Open right main gear door (Ref. 32-12-11, P. Block 301).

WARNING : WHEN DOORS ARE OPEN MAKE CERTAIN THAT SAFETY COLLARS ARE POSITIONED ON DOOR ACTUATING CYLINDERS.

(g)Depressurize Yellow hydraulic system and Yellow braking system by means



TEMPERATURE CORRECTION CHART

−20	−10	0	+10	+20	+30	+40	+60	°C
86	90	93	97	100	104	107	114	Bars
−4	+14	+32	+50	+68	+86	+104	+140	°F
1247	1305	1349	1407	1450	1508	1552	1653	PSI

Charging Accumulators
Figure 001

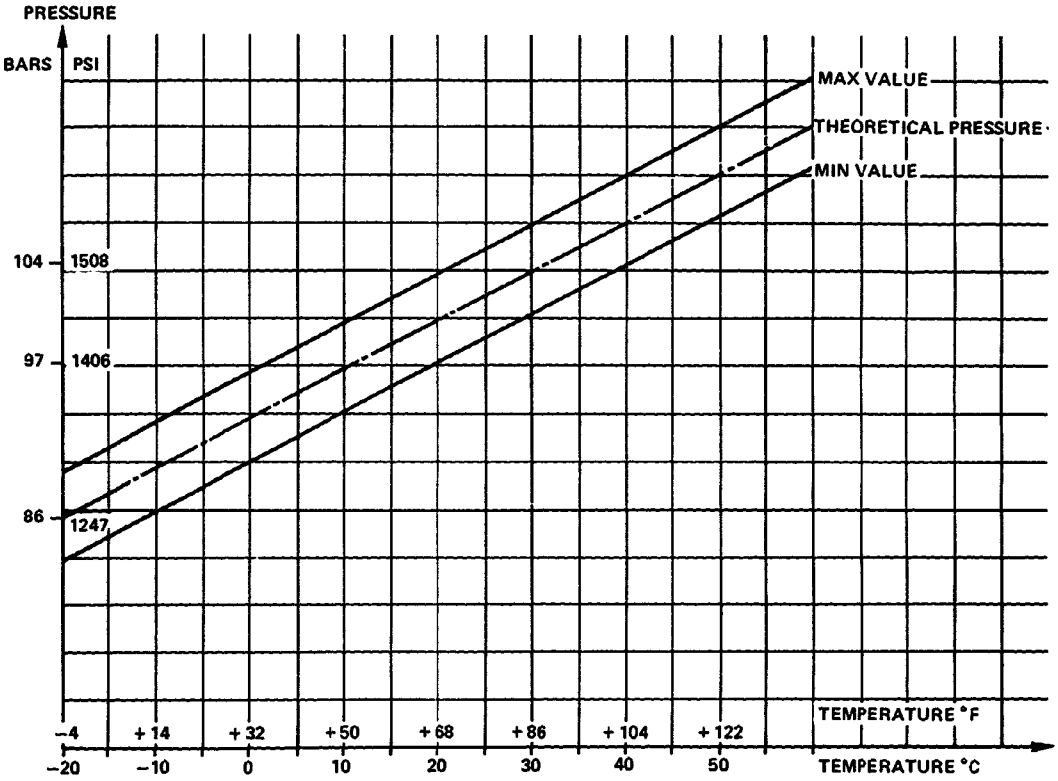
of pressure relief valve 3067 using manual control located on pressure manifold 3060 and prohibit pressurization by displaying a warning notice :
- on Yellow hydraulic system ground connectors.
- on panel 427VU to prohibit energization of power transfer unit (right PTU pushbutton switch).

(h)Depressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301) and prohibit its pressurization by displaying a warning notice : (Ref. 29-13-00, P. Block 301) and prohibit pressurization by displaying a warning notice :
- on panel 429VU to prohibit APU starting.
- on hydraulic reservoir pressurization connector.

(2)Accumulator Charging
(Ref. Fig. 002)
NOTE : The following procedure is described for one accumulator. It is the same for the other accumulator.

(a)Remove protective cap (1) from filling valve.
(b)Unscrew nut (2) by one turn and a half.
(c)Connect line (4) between the nitrogen source and three-way valve.
(d)Connect line (3) to three-way valve.
(e)Install a pressure gage graduated from 0 to 150 bars (0 to 2175 psi) on the three-way valve.
(f)Open valves A and B and apply nitrogen pressure to bleed the system.
(g)Close valves A and B.
(h)Connect line (3) to the filling valve.
(j)Open valve A gradually and stabilize the pressure at 100 bars (1450 psi) according to ambient temperature.
Close valve A.
(k)Tighten nut (2). Depressurize Yellow system by means of pressure relief valve 3067 using manuel control and make certain that accumulator pressure gage still indicates correct pressure. Top up nitrogen as necessary. Make certain that accumulator pressure gage indicates 100 bars (1450 psi).
(l)Open valve B to bleed the system. (Pressure gage pointer returns to zero).
(m)Disconnect line (3) from filling valve.
(n)Install protective cap (1) on filling valve.
(p)Close nitrogen source valve and open three-way valve A to bleed the system.
(q)Disconnect line (4) from nitrogen source and three-way valve.
(r)Disconnect line (3) to three-way valve.

(3)Close-Up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Pressurize hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(c)Remove safety clips and tags, and close circuit breakers 4GE and 7GX.
WARNING : MAKE CERTAIN THAT DOOR TRAVEL RANGES ARE CLEAR.
(d)Close landing gear doors (Ref. 32-12-11, P. Block 301).
(e)Remove warning notices.
(f)Close access doors, remove access platform and safety barriers.



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Accumulator Charging Chart
Figure 002

(g)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

7. Cross Ply Tires/Radial Tires Mixability

The main requirement for mixability is the compatibility of the loaded radii.
Therefore, when a radial tire is fitted with equivalent bias ply tire (e.g. 46X17R20 with 46X16.0-20, 40X14R16 with 40X14.0-16), they have the same loaded radii (SLR).
However, it is possible to observe a slight difference between the unloaded outside diameter of the two tires.
This difference has no effect on :
- stopping distance,
- anti-skid tuning.

A. Mixability between Main Landing Gear and Nose Landing Gear

(1)2 cross ply tires 40X14.0-16 on the NLG, and 8 radial tires 46X17R20 on the MLG.

or

(2)2 radial tires 40X14R16 on the NLG, and 8 cross ply tires 46X16.0-20 or 49X17.0-20 on the MLG is allowed.

B. Mixability on the same Landing Gear

(1)Nose landing gear
Mixability of 1 cross ply tire 40X14.0-16 with 1 radial tire 40X14R16 on the NLG is authorized.

(2)Main landing gear
Mixability of radial tires 46X17R20 and cross ply tires 46X16.0-20 on one or two MLG bogie(s) is authorized.

NOTE : Mixability of cross ply tire 49X17.0-20 and cross ply tire 46X16.0-20 is not authorized.

OXYGEN

WARNING : THIS OPERATION CALLS FOR VERY SPECIAL PRECAUTIONS :
A WARNING NOTICE SHALL BE INSTALLED IN THE WORK AREA.
PERSONNEL SHALL CLEAN TOOLS AND ENSURE THAT THEIR HANDS ARE CLEAN TO AVOID CONTAMINATION.
PREVENT ALL MAINTENANCE PROCEDURES ON THE AIRCRAFT (REFUELING, REPAIR OF FUEL AND HYDRAULIC SYSTEMS, USE OF FLAMMABLE MATERIALS (CLEANING, DE-ICING, ETC...), CONNECTION/DISCONNECTION OF THE GROUND POWER CONNECTOR).
USE ONLY TOOLS AND EQUIPMENT SPECIFICALLY ALLOCATED FOR HANDLING OXYGEN.
GROUND THE AIRCRAFT ELECTROSTATICALLY AND EFFECT A GROUND CONNECTION BETWEEN THE EQUIPMENT AND THE AIRCRAFT. RESPECT SCRUPULOUSLY THE REPLENISHING INSTRUCTIONS. THE PRESENCE OF HYDROCARBONS IS STRICTLY PROHIBITED.

(Ref. Fig. 001)
(Ref. Fig. 002)

NOTE : The operation is identical for the two oxygen cylinders.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Oxygen Replenishing Unit
B.	Pressure Indicator (Special, Oxygen)
C.	Thermometer
D.	Access Platform

2. Cylinder Replenishing

A. Job Set-Up

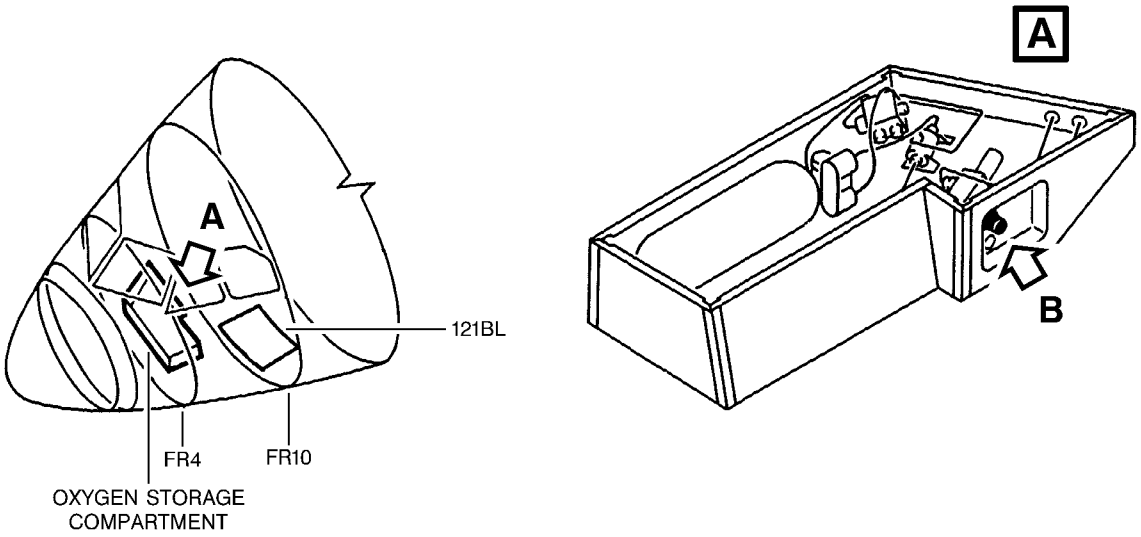
(1)On panel 435VU, check that LO PR SUPPLY pushbutton switch is released.
(2)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
22VU	OXYGEN/CREW	18HT	208/B28

(3)Position access platform.
(4)Open access door 121BL.
(5)Make certain that discharge indicator disc is present.
(6)On oxygen storage compartment, open replenishing panel.

B. Replenishing (Ref. Fig. 003)

(1)Connect replenishing unit to fill port.
(2)Make certain that oxygen cylinder valve is open.
(3)A precision pressure gage is to be installed in the replenishing circuit.
(4)Note the ambient temperature (inside oxygen storage compartment).
(5)Determine the charging pressure in relation to ambient temperature.



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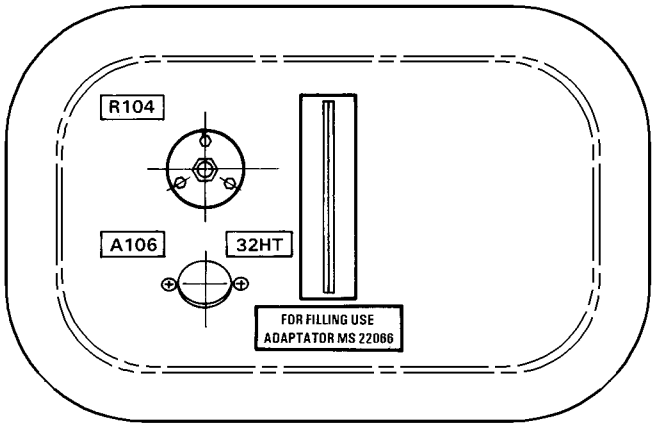

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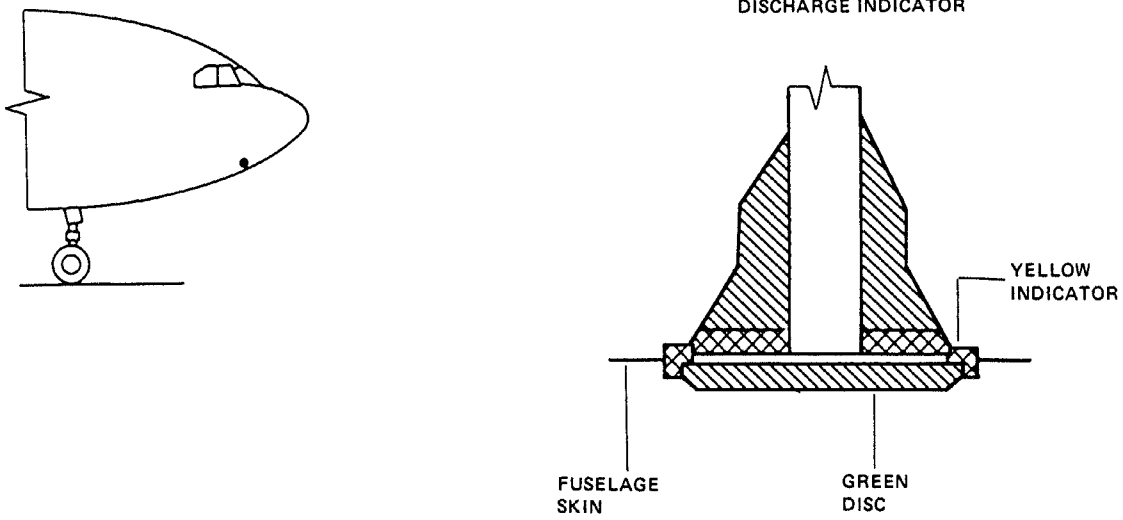
Location of Oxygen Fill Port
Figure 001



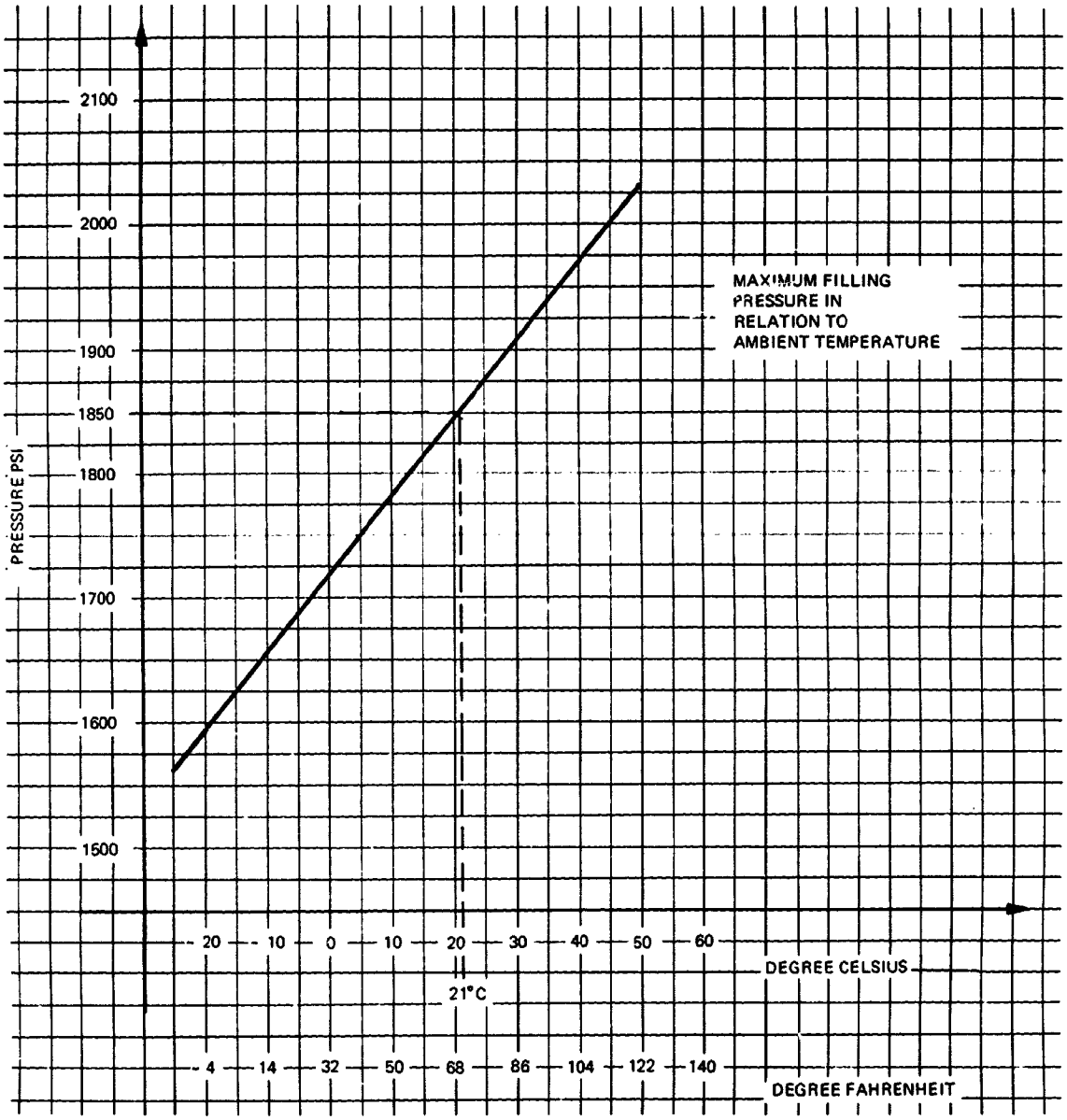
BM5 12 14 35 0 AGM0 19 15
DM5

Location of Discharge Indicator
Figure 002

(6)Slowly pressurize system. Check charging by reading pressure gage. Replenish system.

C. Close-Up

(1)Close replenishing unit shut-off valve.
(2)Disconnect replenishing unit.
(3)Install blanking caps on fill port and replenishing unit fitting.
(4)Close access door 121BL.
(5)Remove access platform.
(6)Remove safety clip and tag and close circuit breaker 18HT.



Filling Pressure Curve
Figure 003

REPLENISHING POTABLE WATER

WARNING : FOR HEALTH REASONS USE POTABLE WATER ONLY.
CAUTION : WATER PRESSURE MUST NOT EXCEED 50 PSI (3.45 BAR).

1. General

A. The potable water system is fed from three water tanks, each with a capacity of 200 l (53 US gal.).

R **ON A/C 101-200,

B. Topping up the water system is accomplished from the potable water service panel which is equipped with the following filling components:
- Quantity gage (4MA)
- Fill/overflow and drain valve control handle
- Fill/drain port with cap
- Overflow port
- Door microswitch (10MA)

R **ON A/C 001-100,

B. Topping up the water system is accomplished from the potable water service panel which is equipped with the following filling components:
- TANK FULL indication light (17MA)
- Fill/overflow and drain valve control handle
- Fill/drain port with cap
- Overflow port
- Door microswitch (10MA)

R **ON A/C 101-200,

C. Water quantity is indicated on combi gage (22MA) at purser's panel (863VU) and on quantity gage (4MA) at potable water service panel.

R **ON A/C 001-100,

C. Water quantity is indicated on combi gage (22MA) at purser's panel (863VU).

D. The water quantity to be stored can be selected by preselection switch (16MA) on purser's panel (863VU).
When the preselected water quantity is reached, the motorized fill/overflow and drain valve (18MA) is closed automatically by the preselection control unit (15MA) and the TANK FULL indication light (17MA) on the potable water service panel comes on.

**ON A/C 101-200,

D. Cold Weather Precaution

**ON A/C 001-100,

E. Cold Weather Precaution

**ON A/C ALL

Water system draining is necessary under the following conditions:

CONFIGURATION			COLD SOAK TIME	WATER TANK DRAIN
AIR CONDITIONING	CABIN TEMPERATURE	OUTSIDE AIR TEMPERATURE		
ON	ABOVE 10 °C (50 °F)	BETWEEN 0 AND -15 °C (32 AND 5 °F)	ANY	NOT REQUIRED
		BELOW -15 °C (5 °F)	1 H 15 MIN	REQUIRED
OFF		BETWEEN 0 AND -7 °C (32 AND 19.4 °F)	1 H 30 MIN	
		BETWEEN -7 AND -15 °C (19.4 AND 5 °F)	0 H 45 MIN	
		BELOW -15 °C (5 °F)	ANY	

NOTE : After required draining (Ref. 12-24-38, P. Block 1), water system shall be refilled with warm water (30 °C (86 °F)) 30 minutes before engine start (Ref. 12-15-38, P. Block 1).

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 1 m (3 ft.).
B.	Water Service Vehicle
C.	Electrical Ground Power Unit - 3-phase, 115/200 V, 400 Hz

Referenced Procedures

- 12-15-38, P. Block 1	Replenishing Potable Water
- 12-24-38, P. Block 1	Potable Water System - Draining
- 24-41-00, P. Block 301	AC External Power Control

3. Procedure

A. Job Set-Up

(1)Position access platform and open potable water service panel access door (136BR).

(2)Remove cap from fill/drain port and connect water service vehicle.

R NOTE : A residual level of chlorine can be maintained during A/C potable
R water filling as per SIL 38-040.

R NOTE : Filtration of the water supplied to A/C can be done by an in-line
R water filter cartridge as per SIL 30-041.

(3)Make certain that the manual shutoff valves in all sanitary units are open.

(4)Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
800VU	WATER SYSTEM	1MA	H 5

(5)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(6)Make certain that electronics racks ventilation is correct.

(7)Make certain that forward and aft motorized shutoff valves (17MD, 18MD) are open.

NOTE : Valves are shut when pushbuttons WATER FWD SHUT (15MD) and WATER AFT SHUT (16MD) on purser's panel (863VU) are latched in and indicator lights are on.

(8)Make certain that motorized drain valve (6MP) is closed.

NOTE : Indication light REAR DRAIN VALVE OPEN (2MP) on potable water service panel is off and drain panel access door (153AL) must be closed.

B. Replenish Water Tank

**ON A/C 001-100,

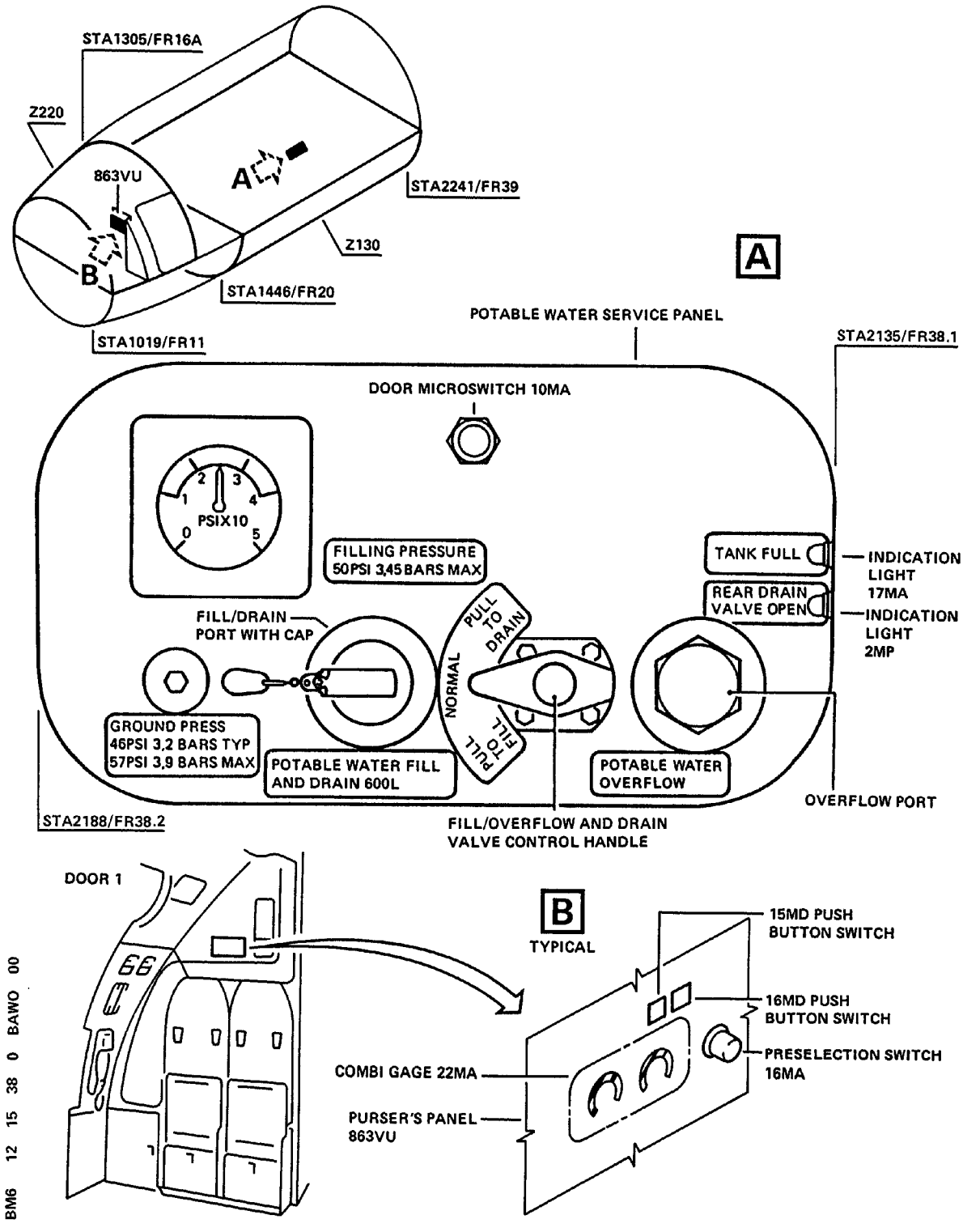
(Ref. Fig. 001)

**ON A/C 101-200,

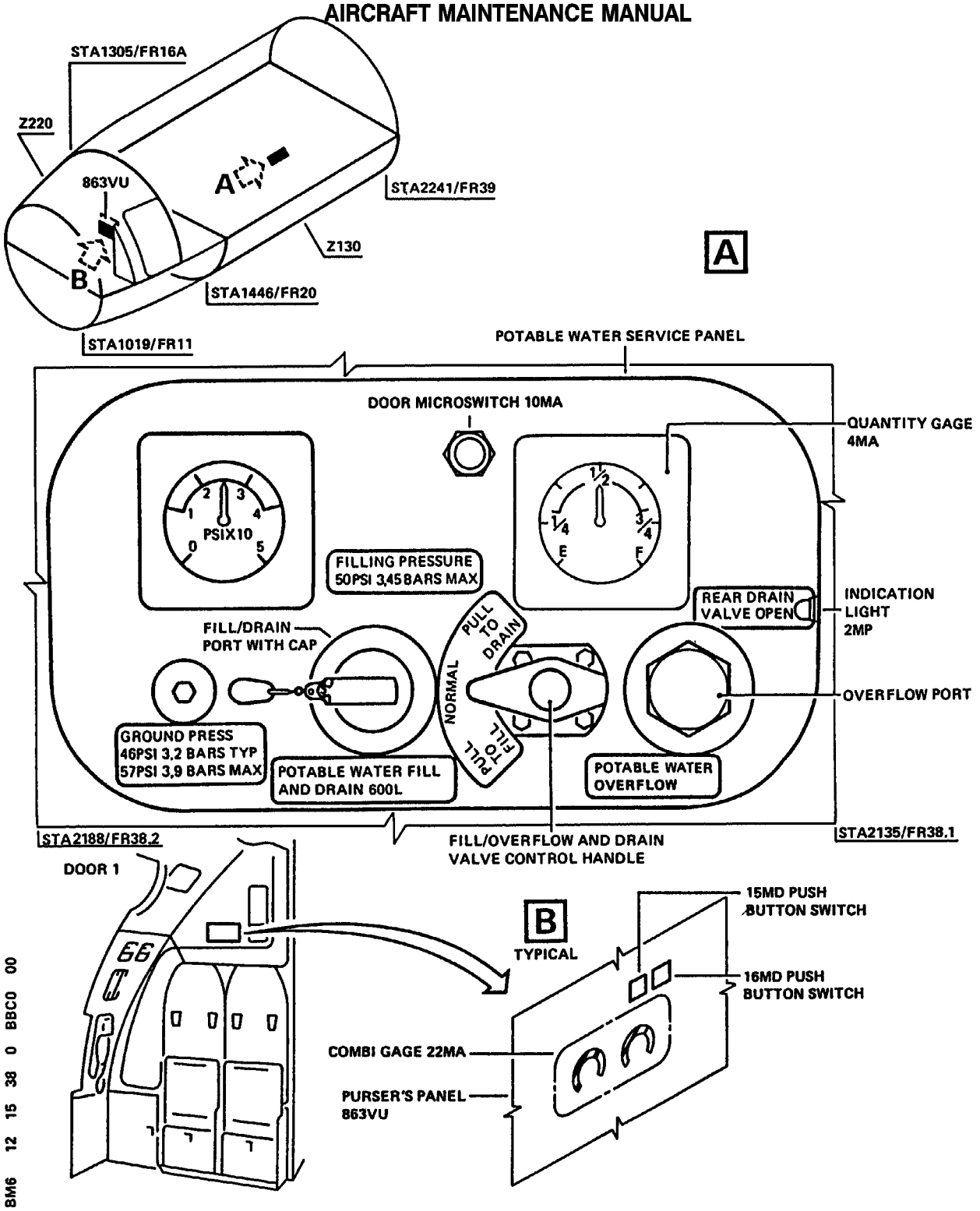
(Ref. Fig. 002)

(1)Turn and pull fill/overflow and drain valve control handle from NORMAL to FILL position.

NOTE : Remaining air in water system escapes via overflow port.



Panel Location
Figure 001



Panel Location
Figure 002

R

CAUTION : WATER PRESSURE MUST NOT EXCEED 50 PSI (3.45 BAR).

(2)On water service vehicle regulate service pressure to max. 50 psi (3.45 bar) and fill potable water system.

NOTE : While filling, observe quantity gage (4MA) for indication.

NOTE : Potable water system is completely full when water escapes via overflow port in a steady stream.

NOTE : Escaping water should be collected in a suitable container.

(3)Push and turn fill/overflow and drain valve control handle from FILL to NORMAL position.

R **ON A/C 001-100,

(1)Select required water quantity by preselection switch (16MA) on purser's panel (863VU).

(2)Turn and pull fill/overflow and drain valve control handle from NORMAL to FILL position.

NOTE : Remaining air in water system escapes via overflow port.

CAUTION : WATER PRESSURE MUST NOT EXCEED 50 PSI (3.45 BAR).

(3)Activate water service vehicle and stabilize water pressure to max. 50 psi (3.45 bar).

NOTE : When the preselected water quantity is reached, the fill/overflow and drain valve (18MA) closes automatically and the TANK FULL indication light (17MA) comes on.

NOTE : Fill/overflow and drain valve control handle returns automatically to NORMAL position.

R **ON A/C ALL

(4)Deactivate and disconnect water service vehicle.

(5)Wipe dry service panel and adjacent area.

R **ON A/C 101-200,

(6)Compare combi gage (22MA) and quantity gage (4MA) for indicated water quantity.

R **ON A/C 001-100,

(6)Compare the indicated water quantity on combi gage (22MA) with the preselected water quantity.

R **ON A/C ALL

C. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(3) Fit cap to fill/drain port and close potable water service panel access door (136BR).

(4) Remove access platform.

REPLENISHING - TOILETS

WARNING : FOR HEALTH REASONS ALWAYS WEAR RUBBER GLOVES WHEN HANDLING CONTAMINATED COMPONENTS.

CAUTION : LOCALLY PURCHASED DISINFECTANTS MAY BE USED AS A SUBSTITUTE FOR MAT. NO. 14-001, PROVIDED THAT THEY WILL NOT CAUSE DAMAGE TO SURFACE ON WHICH USED. MANUFACTURERS' INSTRUCTIONS MUST BE STRICTLY ADHERED TO.

CAUTION : WATER PRESSURE MUST NOT EXCEED 3.45 BAR (50 PSI).

1. General

The aircraft is provided with a waste service panel located between frame 70/71 and is equipped with the following components:

- A 4-inch connection point to which a 4-inch standard coupling can be connected for draining the waste tanks.
- two 1-inch connection points to which 1-inch couplings can be connected for flushing/priming the respective waste tank.
- two control handles for operating the waste system dump valves. One control handle for each dump valve.
- A TACO-valve with integrated control levers.

The waste tank capacities are:

R **ON A/C 001-100, 103-103, 106-106,

R Post SB 38-2026 For A/C 001-100,103-103,106-106,

1. General

The aircraft is provided with a waste service panel located between frame 70/71 and is equipped with the following components:

- A 4-inch connection point to which a 4-inch standard coupling can be connected for draining the waste tanks.
- two 1-inch connection points to which 1-inch couplings can be connected for flushing/priming the respective waste tank.
- two control handles for operating the waste system dump valves. One control handle for each dump valve.
- A Shaw-valve with integrated PUSH TO OPEN lever.

The waste tank capacities are:

**ON A/C ALL

WASTE TANK	WASTE	PRIME
Toilet System L/H	265 l (70 US gal.)	13 l (3.43 US gal.)
Toilet System R/H	265 l (70 US gal.)	13 l (3.43 US gal.)

2. Reason for the Job

A. To drain and flush the waste tanks

B. Check drain and filler caps of service doors

3. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, up to 4 m (13 ft.)
B.	Access Platform, up to 1 m (3 ft.)
C.	Toilet Service Vehicle with 4-inch standard coupling.
D. Material No. 14-001	Disinfectants (Ref. 20-31-00)

4. Procedure

A. Job Set-Up
(1)Position access platform and open waste service panel access door (171BL).
(2)Check that drain and filler caps of service doors are correctly installed and seals are serviceable.
(3)Open quick-release caps of drain outlet and waste tank flushing ports.

B. Drain, flush and prime waste tanks
(Ref. Fig. 001)

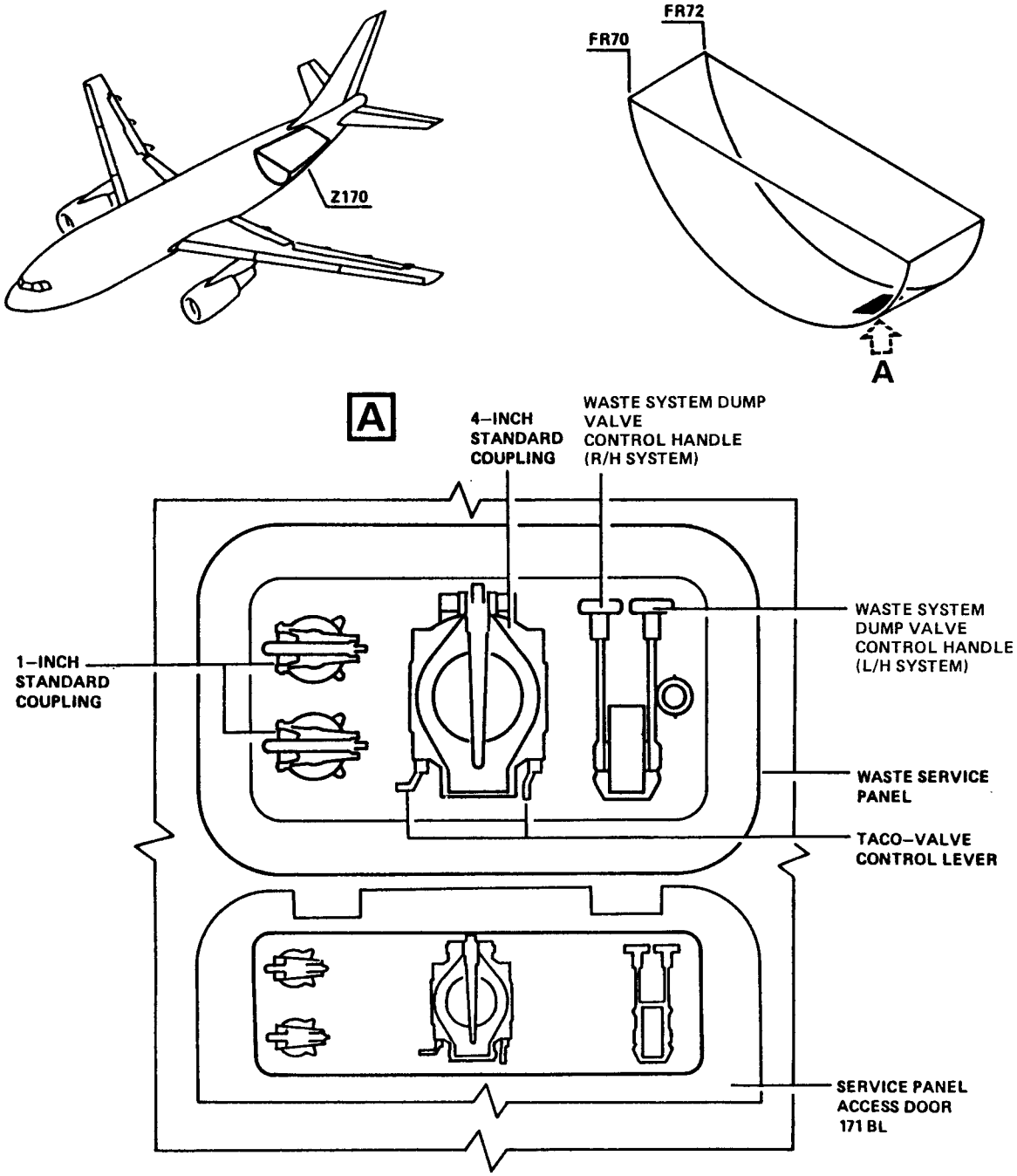
R **ON A/C 001-100, 103-103, 106-106,

R Post SB 38-2026 For A/C 001-100,103-103,106-106,

(Ref. Fig. 002)

**ON A/C ALL

(1)Connect service vehicle 4-inch drain hose coupling to waste outlet.
(2)Rotate TACO-valve OPEN lever 1/4 turn in the direction of the OPEN arrow.
NOTE : TACO-valve control lever is spring located and will automatically return to initial position.
(3)Connect service vehicle 1-inch flush/fill hose to waste tank flushing port at waste service panel.
(4)Pull corresponding waste system dump valve control handle down until locked and allow waste to drain.
CAUTION : WATER PRESSURE MUST NOT EXCEED 3.45 BAR (50 PSI).
(5)Activate service vehicle water system and stabilize water pressure at 3.45 bar and flow rate to 53 l/min. (50 psi and 14 US gal/min.).
(6)Flush waste tank with approximately 30l (7.93 US gal.) of water.
NOTE : This will take approximately 30 seconds.
(7)Return waste system dump valve control handle to closed position, closing the waste system dump valve.
(8)Close the TACO-valve by rotating the CLOSE lever in the direction of the CLOSED arrow.
NOTE : Should closing procedure prove to be difficult, proceed as



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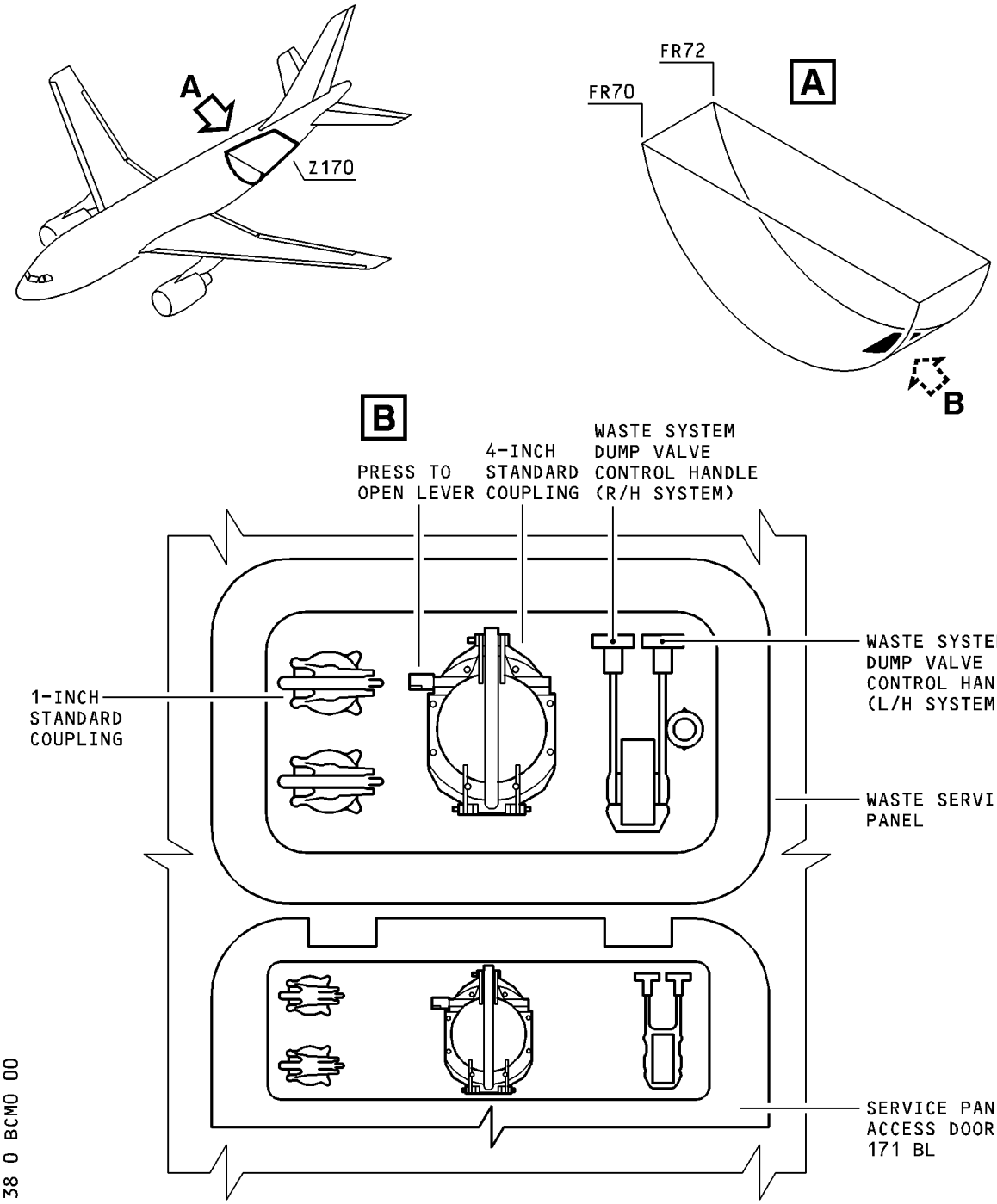
R Panel Location
Figure 001



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Panel Location
Figure 002

follows: rotate **CLOSE** lever in closed, and **OPEN** lever in open position simultaneously. When flapper is in closed position allow **OPEN** lever to return to its initial position.
The valve can be locked by triggering the **OPEN** lever slightly in the opposite direction to the **'OPEN'** arrow.

(9)Disconnect 4-inch drain hose coupling and allow remaining water to drain.
(10)Activate service vehicle disinfectant and deoderizer fluid system and prime L/H and R/H waste tanks with 13 l (3.43 US gal.) each.
NOTE : Do not overfill waste tanks.
(11)During priming, check waste drain outlet for leakage.
NOTE : No leakage is permitted.
(12)Deactivate service vehicle and disconnect the 1-inch flush/fill hose.
(13)Close all quick-release caps.
(14)Clean and dry service panel area with a cloth.

R **ON A/C 001-100, 103-103, 106-106,

R Post SB 38-2026 For A/C 001-100,103-103,106-106,

(1)Connect service vehicle 4-inch drain hose coupling to waste outlet.
(2)Push the **PUSH TO OPEN** lever.
(3)Connect service vehicle 1-inch flush/fill hose to waste tank flushing port at waste service panel.
(4)Pull corresponding waste system dump valve control handle down until locked and allow waste to drain.
CAUTION : **WATER PRESSURE MUST NOT EXCEED 3.45 BAR (50 PSI).**
(5)Activate service vehicle water system and stabilize water pressure at 3.45 bar and flow rate to 53 l/min. (50 psi and 14 US gal/min.).
(6)Flush waste tank with approximately 30l (7.93 US gal.) of water.
NOTE : This will take approximately 30 seconds.
(7)Return waste system dump valve control handle to closed position, closing the waste system dump valve.
(8)Push inner flap valve to the close position until **PUSH TO OPEN** lever clicks.
(9)Disconnect 4-inch drain hose coupling and allow remaining water to drain.
(10)Activate service vehicle disinfectant and deoderizer fluid system and prime L/H and R/H waste tanks with 13 l (3.43 US gal.) each.
NOTE : Do not overfill waste tanks.
(11)During priming, check waste drain outlet for leakage.
NOTE : No leakage is permitted.
(12)Deactivate service vehicle and disconnect the 1-inch flush/fill hose.
(13)Close all quick-release caps.
(14)Clean and dry service panel area with a cloth.

**ON A/C ALL

C. Long period parking
If the A/C is being parked for a long period of time, i.e over night, it must be ensured that the potable water system is depressurized first

in the following manner:

(1)Position access platform and open potable water service panel access door (136BR).

(2)Make certain that cap is tight on fill/drain port.

(3)Turn and pull fill/overflow and drain valve control handle from NORMAL to FILL.

NOTE : System pressure will escape via overflow port.

(4)When potable water system is depressurized turn fill/overflow and drain valve control handle from FILL to NORMAL position.

(5)Remove cap from fill/drain port and allow remaining water to drain.

(6)Install cap to fill/drain port and close the potable water service panel access door (136BR).

(7)Remove access platform.

D. Cold weather servicing

(1)Waste tank draining is necessary under the following conditions:

CONFIGURATION			COLD SOAK	WASTE TANK
AIR CONDITIONING	CABIN TEMPERATURE	OUTSIDE AIR TEMPERATURE	TIME	DRAIN
ON	ABOVE 10 °C 50 °F	BETWEEN 0 AND -15 °C (32 AND 5 °F)	ANY	NOT REQUIRED
		BELOW -15 °C (5 °F)	1 H 15 MIN	
OFF		BETWEEN 0 AND -7 °C (32 AND 19.4 °F)	1 H 30 MIN	REQUIRED
		BETWEEN -7 AND -15 °C (19.4 AND 5 °F)	0 H 45 MIN	
		BELOW -15 °C (5 °F)	ANY	

NOTE : After draining, prime waste tanks 30 minutes before engine start.

(2)If access doors and outlet caps are difficult to open, due to freezing temperatures, apply hot air to doors and caps.

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Check that drain and filler caps of service doors are correctly installed and seals are serviceable.

(3)Close service panel access door (171BL).

(4)Remove access platform.

SCHEDULED SERVICING

1. General

R This section provides information for internal and external cleaning of the aircraft, the lubrication operations covering the various hinged components including landing gears, flight controls, doors, and drainage of lines and systems.

Subjects are sub-divided as follows :

12-21-00 : Cleaning
12-22-00 : Lubrication
12-24-00 : Drainage

CLEANING

1. General

This section, which is divided into two subjects, covers the procedures to apply for the aircraft external and internal cleaning.
These procedures are respectively dealt with in :

- 12-21-11 : External Cleaning
- 12-21-12 : Internal Cleaning

EXTERNAL CLEANING

1. General

The purpose of this operation is to remove:

- all dirt, oil, fuel, other fluid and dust deposits from the exterior area of the aircraft,
- accumulated dirt from landing gear and wheel wells for inspection and maintenance purposes.

Since airborne dust, chemical vapors and wet-landing soils react with aircraft metals if allowed to remain too long, it is recommended that each aircraft be thoroughly washed at the prescribed frequency.

WARNING : WHEN HANDLING CLEANING AGENTS, VENDOR SAFETY PRECAUTIONS SHALL BE STRICTLY ADHERED TO.

WARNING : THERE IS A POSSIBLE HEALTH RISK TO PERSONNEL WHO DO MAINTENANCE TASKS AFTER A BIRD STRIKE. THE SAFETY MEASURES THAT FOLLOW ARE RECOMMENDED.

- USE DISPOSABLE GLOVES.
- USE A DISPOSABLE COVERALL IF THERE IS A RISK OF BODY CONTACT DURING CLEANING.
- DO NOT USE PRESSURIZED AIR OR WATER TO CLEAN THE PARTS WHICH WERE IN CONTACT WITH THE BIRD.
- REMOVE THE BIRD REMAINS AND PUT THEM IN A PLASTIC BAG.
- DO NOT TOUCH YOUR FACE, EYES, NOSE, ETC. WITH YOUR GLOVES.
- REMOVE THE GLOVES AND THE DISPOSABLE COVERALL AND PUT THEM IN THE SAME PLASTIC BAG AS THE REMAINS. SEAL THE BAG.
- DISCARD THE BAG AS YOU DO FOR USUAL GARBAGE.
- CAREFULLY WASH YOUR HANDS WITH SOAP AND WATER.

CAUTION : DURING THE DE-ICING AND WASHING PROCEDURES, MAKE SURE THAT THE HOT WATER OR HOT WATER/FLUID MIXTURES DO NOT CAUSE THE TEMPERATURE OF THE AIRCRAFT SKIN TO INCREASE TO MORE THAN +70°C.

NOTE 1 : Personnel responsible for external cleaning of the aircraft must be properly protected by a complete set of waterproof clothes.

NOTE 2 : Safety belts will be worn while operating and working in high or slippery areas.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Chocks - Wheel
B.	Nose Gear Wheel Chocks
C.	Access Platform 17 m (55 ft. 9 in.) Max.
D.	Pressure Spraying Equipment
E.	Long-Handled Soft-Bristled Brush
F.	Mop
G.	Adhesive Tape
H.	Sealed Coverall with Hood
I.	Rubber Boots
J.	Rubber Working Gloves
K.	One-Piece Visor
L.	Chamois Leather
M.	Lint-Free Cloth

ITEM	DESIGNATION
N.	Polyethylene Film or Similar
O. Material No. 05-027	Special Materials (Ref. 20-31-00)
P. Material No. 10-001	Anti-Icing and De-Icing Materials (Ref. 20-31-00)
Q. Material No. 11-001	Cleaning Agents (Ref. 20-31-00)
R. Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
S. Protective Equipment	
(1)98A10001013000	Cover - Slip-on, Total Temperature Sensor
(2)98A10001005000	Cover - Slip-on, Pitot Probe
(3)98A10001500000	Cover - Slip-on, Angle-of-Attack Sensor
or	
98D10003003000	
(4)98A10001021000	Cover - Static Port
or	
98A10003500000	
(5)98A10003003000	Cover, Blanking - Air Conditioning Fresh Air Intake
(6)98A10007608000	Plug - APU Exhaust Duct
(7)98A10007610000	Plug - APU Oil Cooler Air Outlet
(8)98A10003002000	Cover, Blanking-Pre-Cooler Air Outlet
**ON A/C 001-100,	
(9)RSE 1061	Cover - Engine Inlet
or	
98A10001508000	
10)RSE 1082	Cover - Primary Nozzle
11)RSE 1062	Plug - A/I Overboard Vent
12)RSE 1035	Plug - Fan Cowl IDGS Vent
13)RSE 1036	Plug - Fan Cowl Vent
14)RSE 1042	Plug - PMC Vent Inlet Cowl
15)98A10001506000	Cover, Blanking - GE Engine Fan Exhaust
**ON A/C 101-200,	
(9)RSE 1016	Cover - Nose Cowl
or	
98A10001502000	
10)RSE 1102	Cover - Primary Exhaust
11)RSE 1103	Plug - Thrust Reverser Duct
12)RSE 1020	Plug - Gearbox Vent
13)RSE 1019	Plug - A/I Overboard Vent
**ON A/C ALL	
Referenced Procedures	
- 09-11-00, P. Block 1	Towing
- 12-22-32, P. Block 1	Landing Gear

ITEM	DESIGNATION
- 12-31-11, P. Block 1	Anti-Icing Protection
- 12-31-12, P. Block 1	Ice and Snow Removal
- 32-00-00, P. Block 701	Landing Gear - Cleaning
- 32-12-11, P. Block 301	Main Gear Main Door - Servicing (Ground Doors(s) Opening)
- 32-22-11, P. Block 301	Nose Gear Main Door - Servicing (Ground Doors(s) Opening)
- 56-11-11, P. Block 701	Windshield Panels
- 56-21-11, P. Block 701	Passenger Compartment Windows
- 56-31-14, P. Block 701	Passenger/Crew Door Window

3. Procedure

A. General

(1)Quality of water for aircraft external cleaning

(a)We recommend that you use potable water for aircraft external cleaning.

(b)We recommend that you do not use:

- water that contains a high level of chlorine and/or is acidic/alkaline because of the risk of corrosion
- treated water from city drainage because of the risk of bacteriological contamination. Refer to your local regulation.

(c)If you decide to use water that is not potable, we recommend that:

1 You use water that has these qualities:

- PH between 7 and 8,
- chloride level less than 100 ppm.

2 You do a final rinse with potable water.

B. Job Set-Up

(1)Tow the aircraft to the cleaning area (Ref. 09-11-00, P. Block 1).

NOTE : Engines must be cold.

(2)Position the main gear and nose gear wheel chocks:

(a)For the NLG:

- in front of and behind the wheels.

(b)For the MLG:

- in front of the FWD wheels and behind the AFT wheels.

(3)Make sure that the ground safety pins are installed on the main and nose gears.

(4)Make certain that all doors (cargo compartment doors, passenger doors, passenger/crew doors, emergency exits, access panels, service panels and sliding windows) are closed.

R You can use adhesive tape to get better sealing. Record the locations
R where you put the adhesive tape.

(5)Make certain that flaps, slats and spoilers are retracted and thrust reversers are stowed.

(6)Make certain that the aircraft electrical network is de-energized.

(7)Connect aircraft-to-ground grounding cable to grounding point located on shock strut at upper torque link attach-point.

(8)Install protective equipment.

WARNING : DO NOT APPLY ADHESIVE TAPE ON THE PROBES, DUCTS, SENSORS (STATIC, PITOT, TAT, AOA).
USE ONLY THE SPECIFIED TOOLS FOR THE PROTECTION OF THE AIRCRAFT. THE SPECIFIED TOOLS:
- GIVE THE CORRECT PROTECTION TO THE AIRCRAFT EQUIPMENT,
- ARE EASY TO SEE FROM THE GROUND,
- ARE EASY TO REMOVE.
IF YOU USE TAPE, THERE IS A RISK THAT SOME TAPE, OR ADHESIVE FROM THE TAPE, WILL STAY ON THE PROBES, DUCTS OR SENSORS. THIS CAN CAUSE INCORRECT INDICATIONS ON THE RELATED COCKPIT INSTRUMENTS.

(a)Install protective equipment on APU:
- put APU exhaust duct plug (98A1007608000) in position
- put APU oil cooler air outlet plug (98A10007610000) in position.

(b)Install protective equipment on fuselage and pylon:
- put the 3 pitot probe covers (98A10001005000) in position
- put the 4 static port covers (98A10001021000 or 98A10003500000) in position
- put the 2 total temperature sensor covers (98A10001013000) in position
- put the 3 angle-of-attack sensor covers (98A10001500000 or 98D10003003000) in position
- put the 2 air conditioning fresh air intake covers (98A10003003000) in position
- put the 2 pre-cooler air outlet covers (98A10003002000) in position.

(c)Install protective equipment on engines:

**ON A/C 001-100,

- put engine inlet covers (RSE 1061 or 98A10001508000) in position
- put primary nozzle covers (RSE 1082) in position
- put A/I overboard vent plugs (RSE 1062) in position
- put fan cowl IDGS vent plugs (RSE 1035) in position
- put fan cowl vent plugs (RSE 1036) in position
- put PMC vent inlet cowl plug (RSE 1042) in position
- put engine fan exhaust covers (98A10001506000) in position

**ON A/C 101-200,

- put nose cowl covers (RSE 1016 or 98A10001502000) in position
- put primary exhaust nozzle covers (RSE 1102) in position
- put thrust reverser duct covers (RSE 1103) in position
- put gearbox vent plugs (RSE 1020) in position
- put A/I overboard vent plugs (RSE 1019) in position.

**ON A/C ALL

(d)Protect the tires and brakes with polyethylene film or similar.

NOTE : To make the aircraft completely tight, adhesive tape should be applied on all joints and orifices to avoid damage caused by

cleaning agent or rinsing water. Record locations where adhesive tape is applied.

(9)Remove the ground handling equipment from the vicinity of the aircraft.

(10)Prepare the spraying equipment and cleaning agent Material No. 11-001 according to vendor instructions.

NOTE : For areas of heavy dirt accumulation, such as landing gear wells, increase concentration while remaining within recommended limits.

(11)Position access platform.

C. Procedure

NOTE 1 : In temperature conditions ≤ 0°C (32°F) or in the presence of ice or snow, apply following recommendations during cleaning procedure:
- De-ice aircraft (Ref. 12-31-12, P. Block 1).
- Spray aircraft using water heated to between 38°C and 43°C (100°F and 110°F) and mixed with anti-icing and de-icing Material No. 10-001 according to vendor instructions, except for rinsing, where 25% to 30% proportions of this Material may be used.
- If ice accretion occurs during rinsing, carry out an anti-icing treatment (Ref. 12-31-11, P. Block 1) after rinsing.

WARNING : CLEANING AGENTS MUST BE USED WITH CARE AS THEY MAY CAUSE DAMAGE TO PLEXIGLAS. THEY MUST NOT BE USED ON WINDOWS OR WINDSHIELD PANELS.

NOTE 2 : If aircraft is hot, precede detergent application with a cold water rinse to lower skin temperature.

NOTE 3 : Check aircraft for asphalt deposits. Remove with a mop slightly dampened (not wet) with Kerosene or solvent Material No. 11-003.

NOTE 4 : Always apply detergent from bottom to top to prevent streaking on dry areas.

NOTE 5 : Under hot and/or windy conditions, spray, agitate and rinse smaller areas (not entire aircraft) to prevent detergent drying.

NOTE 6 : When removing hardened mud or similar foreign matter, particular care must be taken to prevent surface scratches.
Do not attempt to remove stains from paintwork.

(1)Cleaning of aircraft exterior

CAUTION : DO NOT USE A COMPRESSED AIR SUPPLY OF MORE THAN 10 PSI (0.70 BAR) PRESSURE:
- IF YOU USE A SPRAY GUN OR
- WHEN YOU USE COMPRESSED AIR TO DRY THE CLEANED PARTS.
AN IMPACT PRESSURE OF MORE THAN 10 PSI (0.70 BAR) WILL CAUSE DAMAGE TO THE PARTS.

(a)For greatest efficiency, perform successive cleaning of aircraft surfaces in following order:

1 Forward lower fuselage from wing leading edges to aircraft nose.
2 Rear lower fuselage from wing trailing edges to stabilizer leading edges.
3 Wing upper surface between fuselage and engine pylon.
4 Upper fuselage from nose to stabilizers.
5 Lower fuselage center section, engine cowls and wing lower surface.

6 Tail cone, vertical stabilizer and upper and lower surfaces of horizontal stabilizer.

NOTE : In the THS apron area, it is important to point the spray from the front to the rear. If you point the spray in the other direction (rear to front), cleaning product fluid can go into the rear fuselage non-pressurized compartment.

7 Wing upper surface to wing tips.

(b)Spray cleaning agent onto surfaces to be cleaned.

(c)Allow cleaning agent to take effect and rinse with hot water under pressure.

(d)In areas where dirt is most persistent, gently scrub surface using mop and cleaning agent.

(e)Thoroughly rinse.

NOTE 1 : Before fully dry, rinse all aircraft surfaces with water under pressure at a temperature not exceeding 65°C (150°F). No steam permitted.

NOTE 2 : Water jet must always be directed towards rear of aircraft.

NOTE 3 : When rinsing wings and stabilizers, always leave lower surface until last.

(f)Wash flight compartment fixed and sliding side window panels with a chamois leather moistened with clean water.

NOTE : Make certain that chamois leather is free from abrasive materials.

(g)Remove water with a well-wrung chamois leather.

(h)Polish with a clean, dry, lint-free cloth.

(j)Clean windshield panels (Ref. 56-11-11, P. Block 701).

(k)Clean passenger compartment windows (Ref. 56-21-11, P. Block 701).

(l)Clean passenger/crew door windows (Ref. 56-31-14, P. Block 701).

(2)Cleaning of landing gear

(a)Open nose gear main door (Ref. 32-22-11, P. Block 301) and main gear main door (Ref. 32-12-11, P. Block 301).

WARNING : WHEN LANDING GEAR DOORS ARE OPEN, MAKE CERTAIN THAT SAFETY COLLARS ARE POSITIONED ON DOOR ACTUATING CYLINDERS.

NOTE 1 : Make certain that all openings in the gear wells are closed or covered.

NOTE 2 : Avoid all electrical components such as wiring, J-boxes, connectors, etc.

NOTE 3 : Do not spray any detergent or water directly onto control steering cables and pulley assembly.

(b)Spray cleaning agent inside gear wells, on landing gear, and inner surface of landing gear doors.

(c)Hand agitate with mop or brush for inaccessible areas.

(d)Thoroughly rinse with hot water not exceeding 65°C (150°F) before cleaning agent has dried.

(e)Hand agitate any persistent soils or grease using cleaning agent.

(f)Rinse quickly with hot water to remove all detergent.

NOTE : Take care to prevent deposits of foam becoming trapped in any part of the structure.

(g)Perform waterproofing of all components of the landing gear

and the landing gear well using Material No. 05-027.

(h)After drying, lubricate landing gear and landing gear doors (Ref. 12-22-32, P. Block 1).

(j)Remove safety collars.

D. Close-up

NOTE : Water repellent Material No. 05-027 may be applied to certain parts of the aircraft, e.g. accessible parts of flaps, especially hinges and bearings, front and rear wing spars.

(1)Remove protective equipment.

(a)Remove protective equipment from APU:

- APU exhaust duct plug (98A1007608000)
- APU oil cooler air outlet plug (98A10007610000).

(b)Remove protective equipment from fuselage and pylon:

- the 3 pitot probe covers (98A10001005000)
- the 4 static port covers (98A10001021000 or 98A10003500000)
- the 2 total temperature sensor covers (98A10001013000)
- the 3 angle-of-attack sensor covers (98A10001500000 or 98D10003003000)
- the 2 air conditioning fresh air intake covers (98A10003003000)
- the 2 pre-cooler air outlet covers (98A10003002000).

(c)Remove protective equipment from engines:

**ON A/C 001-100,

- remove engine inlet covers (RSE 1061 or 98A10001508000)
- remove primary nozzle covers (RSE 1082)
- remove A/I overboard vent plugs (RSE 1062)
- remove fan cowl IDGS vent plugs (RSE 1035)
- remove fan cowl vent plugs (RSE 1036)
- remove PMC vent inlet cowl plug (RSE 1042)
- remove engine fan exhaust covers (98A10001506000)

**ON A/C 101-200,

- remove nose cowl covers (RSE 1016 or 98A10001502000)
- remove primary exhaust nozzle covers (RSE 1102)
- remove thrust reverser duct covers (RSE 1103)
- remove gearbox vent plugs (RSE 1020)
- remove A/I overboard vent plugs (RSE 1019).

**ON A/C ALL

(d)Remove protection from tires and brakes.

(2)Remove all adhesive blanking tape (refer to locations recorded at installation) and remove any adhesive using a clean cloth moistened with Material No. 11-003.

(3)Make certain that no water or detergent has infiltrated into door hinges or unblanked openings or receptacles.

(4)Make an entry in the aircraft logbook and attach a tag on the Captain
R control column to tell the crew that protection covers/devices have been

installed.
(5)Remove access platform and all ground handling equipment.
(6)Disconnect ground from landing gear.
(7)Remove the tag from the Captain control column or write in the logbook that the protection covers/devices are no longer installed.
(8)Remove landing gear wheel chocks.
(9)Tow the aircraft to the parking area (Ref. 09-11-00, P. Block 1).

INTERNAL CLEANING

1. General

The internal cleaning of the aircraft involves the use of many different cleaning agents on a wide range of materials, both metallic and nonmetallic. In order to simplify the cleaning process, cleaning procedures have been classified according to the type of surface or area to be cleaned. The following represents a list of items and/or areas that require regular cleaning within the aircraft and their relevant cleaning procedure chapter reference.

ITEM/AREA	CLEANING CHAPTER REFERENCE
Acrylic Glass and Other Transparent Surfaces	25-00-00, P. Block 701
Aluminum	25-00-00, P. Block 701
Bilge Cleaning	12-21-12, P. Block 201
Cargo Compartment Ball Mats	25-52-22, P. Block 701
Carpeting/Textile Floor Covering	25-00-00, P. Block 701
Color Impregnated Plastic/Painted and Foil Decorative Surfaces	25-00-00, P. Block 701
Curtains	25-00-00- P. Block 701
Disinfection of Galleys, Toilets and Other Utility Areas	25-00-00, P. Block 301
Disinfection/Pest Control	25-00-00, P. Block 301
Mirrors (Glass)	25-00-00, P. Block 701
Nontextile Floor Covering	25-00-00, P. Block 701
Seat Covers	25-00-00, P. Block 701
Stainless Steel	25-00-00, P. Block 701
Synthetic Leather	25-00-00, P. Block 701
Ecam Display Unit (1WT, 3WT)	31-57-22, P. Block 701

INTERNAL CLEANING - MAINTENANCE PRACTICES

WARNING : APPLY MATERIALS IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS, UNLESS OTHERWISE STATED.
WARNING : SOME MATERIALS CONTAIN IRRITANTS, WEAR PROTECTIVE CLOTHING, FACE MASK AND PROTECT EYES. IF SKIN OR EYES BECOME AFFECTED, WASH AFFECTED AREA IMMEDIATELY WITH CLEAN WATER AND OBTAIN MEDICAL AID.
WARNING : COMPRESSED AIR IS DANGEROUS, WEAR SAFETY GOGGLES AT ALL TIMES.
WARNING : CLEANING AGENTS (MAT. NO. 11-001) AND (MAT. NO. 11-005) ARE DANGEROUS.
CAUTION : AVOID CONTACT OF COMPONENTS WITH WATER AND CLEANING AGENT.
CAUTION : REMOVE OR COVER ALL COMPONENTS IN THE AREA TO BE CLEANED, WIHICH COULD BE DAMAGED BY CONTACT WITH WATER AND/OR CLEANING AGENT.
NOTE : High pressure procedure (Para. (5)) is applicable for all cleaning processes in the bilge area.

1. Reasons for the Job.

A. General cleaning of bilge structure

B. Cleaning after Hydraulic Fluid Spillage

C. Cleaning after Sewage Spillage

D. Cleaning after Shipment of Fish

E. Cleaning with high pressure

R NOTE : For alkaline spillage refer to the SRM 51-78-40, P. Block 1.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform(s) 3 m (10 ft.).
B.	Blanking Caps
C.	Circuit Breaker Safety Clips and Tags
D.	Brush
E.	Clean Lint-Free Cloth
F.	Protective Clothing
G.	Safety Goggles
H.	Hot Air Dryer
J.	Nonmetallic Scraper
K.	Face Mask (with respirator)
L.	Vacuum Cleaner (Industrial Wet and Dry)
R M.	Portable Airless Pump
R N. Material No. 05-005	Special Materials (Ref. 20-31-00)
R P. Material No. 05-014	Special Materials (Ref. 20-31-00)
R R. Material No. 05-023	Special Materials (Ref. 20-31-00)
R S. Material No. 05-027	Special Materials (Ref. 20-31-00)
R T. Material No. 05-038	Special Materials (Ref. 20-31-00)

ITEM	DESIGNATION
U. Material No. 09-013	Sealants (Ref. 20-31-00)
V. Material No. 11-001	Cleaning Agents (Ref. 20-31-00)
W. Material No. 11-005	Cleaning Agents (Ref. 20-31-00)
X. Material No. 16-003	Structure Paints (Ref. 20-31-00)

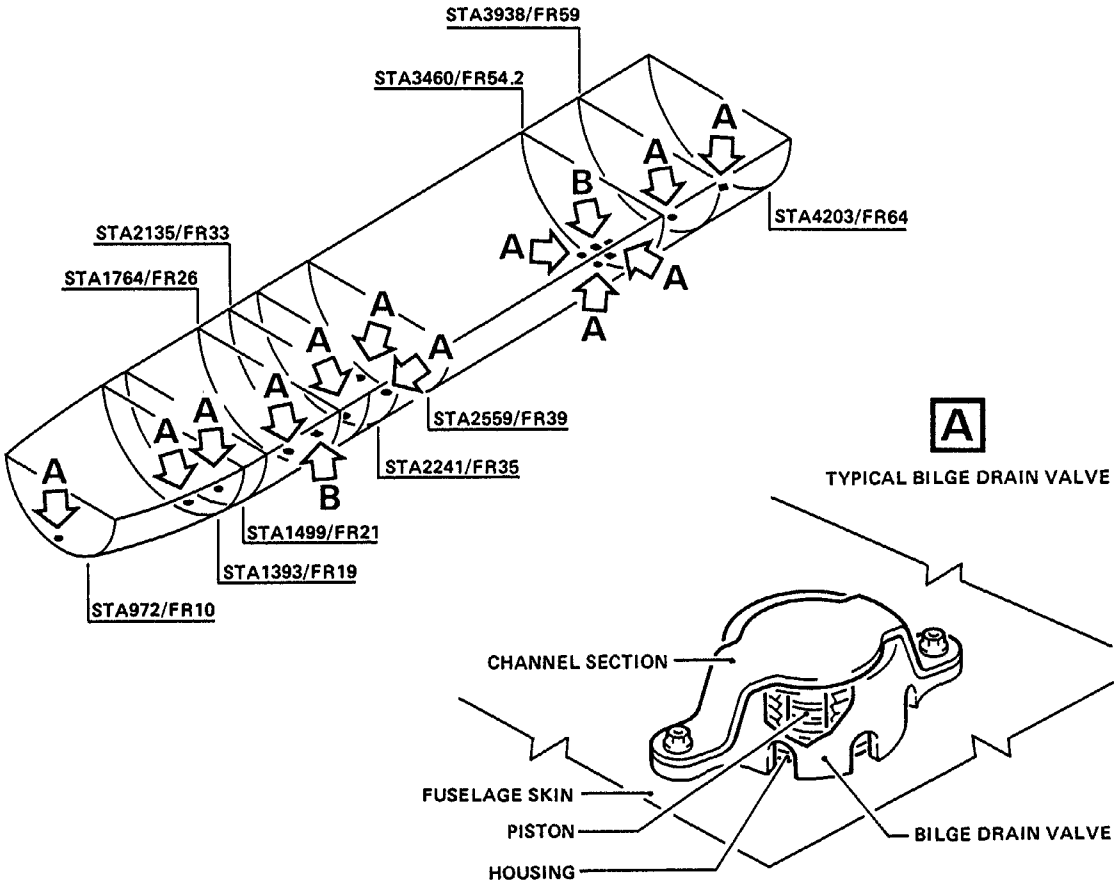
Referenced Procedures

- 25-52-22, P. Block 401	Ball Mats
- 51-23-20, P. Block 1	Special Coatings
- 51-74-10, P. Block 801	Removal of Corrosion
- 51-75-10, P. Block 801	Repair of Paint Coatings
- 51-76-10, P. Block 801	Repair of Sealing
- 51-80-00, P. Block 701	Airframe Drainage
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- 53-10-27, P. Block 401	Avionics Compartment Floor Panels
- 53-10-29, P. Block 401	FWD Cargo Compartment Floor Panels
- 53-10-33, P. Block 401	AFT Cargo Compartment Floor Panels
- 53-10-35, P. Block 401	BULK Cargo Compartment Floor Panels

3. Procedure

A. Job Set-Up
(1)Position access platform(s) under FWD or AFT cargo compartment doors, as required.
(2)Open FWD or AFT cargo compartment door(s), as required and secure with safety lock(s), (Ref. 52-30-00, P. Block 301).
(3)Remove cargo compartment floor panels and ball mats as appropriate, to gain access to bilge area (Ref. 25-52-22, P. Block 401; 53-10-27, 53-10-29, P. Block 401, 53-10-33, P. Block 401 and 53-10-35, P. Block 4).
(4)Remove all insulating materials in the bilge area.
CAUTION : AVOID CONTACT OF COMPONENTS WITH WATER AND CLEANING AGENT.
(5)Open, safety and tag the circuit breakers supplying any electrical components and systems in the working area, which may come into contact with water and/or cleaning agents.
NOTE : Refer to appropriate system chapters for appropriate circuit breaker notation and location.
(6)Remove or cover all components in the area to be cleaned, which could be damaged by water and/or cleaning agents. Cap any electrical connectors and system supply lines.

B. Cleaning
(1)General cleaning of bilge structure
(Ref. Fig. 201)
R CAUTION : DO NOT USE A METAL SCRAPER TO REMOVE THE UNWANTED MATERIAL.
R A METAL SCRAPER CAN CAUSE DAMAGE TO THE SURFACE OF THE
R COMPONENT.
(a)Using a nonmetallic scraper, remove loose deposits in bilge area.
NOTE : Use an industrial wet and dry vacuum cleaner and/or brush to collect loose deposits.



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Bilge Cleaning
Figure 201

WARNING : SOME MATERIALS CONTAIN IRRITANTS, WEAR PROTECTIVE CLOTHING, FACE MASK AND PROTECT EYES. IF SKIN OR EYES BECOME AFFECTED, WASH AFFECTED AREA IMMEDIATELY WITH CLEAN WATER AND OBTAIN MEDICAL AID.

WARNING : APPLY MATERIALS IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS, UNLESS OTHERWISE STATED.

WARNING : CLEANING AGENT (MAT. NO. 11-001) IS DANGEROUS.

(b)Apply diluted detergent (Mat. No. 11-001) to bilge structure with a sponge or clean lint-free cloth.

NOTE : For stubborn stains a medium fibre cleaning brush my be used to assist removal.

CAUTION : THE WATER TEMPERATURE SHOULD NOT BE MORE THAN 40° C (104° F).

(c)Rinse working area with clean and warm water.

NOTE : Make certain that rinsing water drains overboard.

NOTE : If a restriction is observed in bilge draining, repeat steps (a) and (b) to remove restriction. Where restriction is observed in any bilge drain valve, refer to chapter 51-80-00, P. Block 701 for cleaning procedure.

(d)Repeat steps (a) to (c) until area is clean.

CAUTION : THE SURFACE TEMPERATURE SHOULD NOT BE MORE THAN 80° C (176° F).

(e)Dry working area using hot air dryer.

(f)Inspect bilge area for corrosion and remove if evident (Ref. 51-74-10, P. Block 801).

(g)Repair bilge area paint coatings if necessary (Ref. 51-75-10, P. Block 801).

(h)Repair fillet sealing with polysulphide sealant (Mat. No. 09-013) where necessary (Ref. 51-76-10, P. Block 801).

(j)Repair fillet sealant overcoat, as required (Ref. 51-76-10, P. Block 801).

(k)Apply moisture-removing oil (Mat. No. 05-027) thinly to specified areas (Ref. 51-23-20, P. Block 1).

(l)Apply corrosion-preventative compound (Mat. No. 05-005) to all fasteners in working area (Ref. 51-23-20, P. Block 1).

(m)Remove blanking caps from system supply lines and electrical connectors in working area.

(n)Install all system and electrical components previously removed.

(p)Carry out 'Test' and 'Close-Up' procedures.

(2)Cleaning after Hydraulic Fluid Spillage
(a)Cleaning of accessible contaminated areas.

R CAUTION : DO NOT USE A METAL SCRAPER TO REMOVE THE UNWANTED MATERIAL.
R A METAL SCRAPER CAN CAUSE DAMAGE TO THE SURFACE OF THE
R COMPONENT.

1 Using a nonmetallic scraper, remove loose deposits in bilge area.
NOTE : Use an industrial wet and dry vacuum cleaner and/or brush to collect loose deposits.
2 Remove hydraulic fluid spillage with dry cloth or sponge, as required.
WARNING : SOME MATERIALS CONTAIN IRRITANTS, WEAR PROTECTIVE CLOTHING, FACE MASK AND PROTECT EYES. IF SKIN OR EYES BECOME AFFECTED, WASH AFFECTED AREA IMMEDIATELY WITH CLEAN WATER AND OBTAIN MEDICAL AID.
WARNING : APPLY MATERIALS IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS, UNLESS OTHERWISE STATED.
WARNING : CLEANING AGENT (MAT. NO. 11-005) IS DANGEROUS.
3 Clean contaminated areas with cleaning agent (Mat. No. 11-005) and a clean lint-free cloth.
NOTE : Cleaning process must be carried out at a temperature above freezing point.
4 Wipe dry affected areas using a clean lint-free cloth.
WARNING : CLEANING AGENT (MAT. NO. 11-001) IS DANGEROUS.
5 Clean areas with cleaning agent (Mat. No. 11-001) if necessary.
6 Inspect bilge area for corrosion and remove if evident, (Ref. 51-74-10, P. Block 801).
7 Repair bilge area paint coatings, if necessary (Ref. 51-75-10, P. Block 801).
8 Repair fillet sealing with polysulphide sealant (Mat. No. 09-013) where necessary (Ref. 51-76-10, P. Block 801).
9 Repair fillet sealant overcoat as required, (Ref. 51-76-10, P. Block 801).
10 Apply moisture-removing oil (Mat. No. 05-027) thinly to specified areas (Ref. 51-23-20, P. Block 1).
11 Apply corrosion-preventative compound (Mat. No. 05-005) to all fasteners in working area (Ref. 51-23-20, P. Block 1).
12 Remove blanking caps from system supply lines and electrical connectors in working area.
13 Install all system and electrical components previously removed.
14 Carry out 'Test' and 'Close-Up' procedures.

(b)Cleaning of cavities, gaps, lap joints and around stringers.

R CAUTION : DO NOT USE A METAL SCRAPER TO REMOVE THE UNWANTED MATERIAL.
R A METAL SCRAPER CAN CAUSE DAMAGE TO THE SURFACE OF THE
R COMPONENT.

1 Remove loose deposits using a nonmetallic scraper, vacuum cleaner or brush.

NOTE : Use an industrial wet and dry vacuum cleaner and/or brush to collect loose deposits.

WARNING : COMPRESSED AIR IS DANGEROUS, WEAR SAFETY GOGGLES AT ALL TIMES.

2 Using compressed air, carefully blow hydraulic fluid out of cavities and clean affected areas with a clean lint-free cloth.

WARNING : SOME MATERIALS CONTAIN IRRITANTS, WEAR PROTECTIVE CLOTHING, FACE MASK AND PROTECT EYES. IF SKIN OR EYES BECOME AFFECTED, WASH AFFECTED AREA IMMEDIATELY WITH CLEAN WATER AND OBTAIN MEDICAL AID.

WARNING : APPLY MATERIALS IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS, UNLESS OTHERWISE STATED.

WARNING : CLEANING AGENT (MAT. NO. 11-005) IS DANGEROUS.

3 Clean affected area with cleaning agent (Mat. No. 11-005) and clean lint-free cloth. Wipe surface dry after cleaning.

NOTE : Cleaning process must be carried out at a temperature above freezing point.

4 Apply Met-l-check developer (Mat. No. 05-038) to cavaties. When Met-l-check developer turns white, allow to work for 30 minutes.

NOTE : If hydraulic fluid is present, Met-l-check developer will appear wet.

5 Clean affected areas with clean lint-free cloth.

NOTE : Use an industrial wet and dry vacuum cleaner and/or brush to collect loose deposits.

6 Repeat steps 4 and 5 until developer remains dry after application

WARNING : CLEANING AGENT (MAT. NO. 11-001) IS DANGEROUS.

7 Clean affected area with cleaning agent (Mat. No. 11-001) and clean lint-free cloth. Allow cleaning agent to drain overboard.

CAUTION : THE SURFACE TEMPERATURE SHOULD NOT BE MORE THAN 80° C (176° F).

8 Dry affected area using hot air blower.

9 Inspect bilge area for corrosion and remove if evident (Ref. 51-74-10, P. Block 801).

10 Repair bilge area paint coating, if necessary (Ref. 51-75-10, P. Block 801).

11 Repair fillet sealing with polysulphide sealant (Mat. No. 09-013) where necessary (Ref. 51-76-10, P. Block 801).

12 Repair fillet sealant overcoat as required (Ref. 51-76-10, P. Block 801).

13 Apply moisture-removing oil (Mat. No. 05-027) thinly to specified areas (Ref. 51-23-20, P. Block 1).

14 Apply corrosion-preventative compound (Mat. No. 05-005) to all fasteners in working area (Ref. 51-23-20, P. Block 1).

15 Remove blanking caps from system supply lines and electrical connectors in working area.

16 Install all system and electrical components previously removed.

17 Carry out 'Test' and 'Close-Up' procedures.

(3)Cleaning after Sewage Spillage or De-icing Agent (Salt)

R CAUTION : DO NOT USE A METAL SCRAPER TO REMOVE THE UNWANTED MATERIAL.
R A METAL SCRAPER CAN CAUSE DAMAGE TO THE SURFACE OF THE
R COMPONENT.

(a)Using a nonmetallic scraper, remove loose deposits in bilge area.

NOTE : Use an industrial wet and dry vacuum cleaner and/or brush to collect loose deposits.

NOTE : Cleaning process must be carried out at a temperature above freezing point.

WARNING : SOME MATERIALS CONTAIN IRRITANTS, WEAR PROTECTIVE CLOTHING, FACE MASK AND PROTECT EYES. IF SKIN OR EYES BECOME AFFECTED, WASH AFFECTED AREA IMMEDIATELY WITH CLEAN WATER AND OBTAIN MEDICAL AID.

WARNING : APPLY MATERIALS IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS, UNLESS OTHERWISE STATED.

WARNING : CLEANING AGENT (MAT. NO. 11-001) IS DANGEROUS.

(b)Clean bilge area with a solution of water and cleaning agent (Mat. No. 11-001).

NOTE : Ensure cleaning solution drains overboard.

NOTE : If a blockage in either of the bilge drain valves is observed, refer to chapter 51-80-00, P. Block 801 for cleaning procedure.

CAUTION : THE WATER TEMPERATURE SHOULD NOT BE MORE THAN 40° C (104° F).

(c)Flush bilge area with clean and warm water and allow to drain overboard.

CAUTION : THE SURFACE TEMPERATURE SHOULD NOT BE MORE THAN 80° C (176° F).

(d)Dry working area using hot air dryer.

(e)Inspect bilge area for corrosion, remove if evident (Ref. 51-74-10, P. Block 801).

(f)Repair bilge area paint coating, if necessary (Ref. 51-75-10, P. Block 801).

(g)Repair fillet sealing with polysulphide sealant (Mat. No. 09-013) where necessary (Ref. 51-76-10, P. Block 801).

(h)Repair fillet sealant overcoat as required (Ref. 51-76-10, P. Block 801).

(j)Apply moisture-removing oil (Mat. No. 05-027) thinly to specified areas (Ref. 51-23-20, P. Block 1).

(k)Apply corrosion-preventative compound (Mat. No. 05-005) to all fasteners in working area (Ref. 51-23-20, P. Block 1).

(l)Remove blanking caps from system supply lines and electrical connectors in working area.

(m)Install all system and electrical components previously removed.

(n)Carry out 'Test' and 'Close-Up' procedures.

(4)Cleaning after Shipment of Fish

R CAUTION : DO NOT USE A METAL SCRAPER TO REMOVE THE UNWANTED MATERIAL.
R A METAL SCRAPER CAN CAUSE DAMAGE TO THE SURFACE OF THE
R COMPONENT.

(a)Using a nonmetallic scraper, remove loose deposits in bilge area.

NOTE : Use an industrial wet and dry vacuum cleaner and/or brush to collect loose deposits.

NOTE : Cleaning process must be carried out at a temperature above freezing point.

WARNING : SOME MATERIALS CONTAIN IRRITANTS, WEAR PROTECTIVE CLOTHING, FACE MASK AND PROTECT EYES. IF SKIN OR EYES BECOME AFFECTED, WASH AFFECTED AREA IMMEDIATELY WITH CLEAN WATER AND OBTAIN MEDICAL AID.

WARNING : APPLY MATERIALS IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS, UNLESS OTHERWISE STATED.

WARNING : CLEANING AGENT (MAT. NO. 11-001) IS DANGEROUS.

(b)Clean affected area with cleaning agent (Mat. No. 11-001) and clean with a lint-free cloth. Allow cleaning agent to drain overboard.

CAUTION : THE WATER TEMPERATURE SHOULD NOT BE MORE THAN 40° C (104° F).

(c)Rinse affected area with clean and warm water, allow to drain overboard.

WARNING : CLEANING AGENT (MAT. NO. 11-001) IS DANGEROUS.

(d)Clean bilge area with a solution of water and cleaning agent (Mat. No. 11-001).

NOTE : Ensure cleaning solution drains overboard.

NOTE : If a blockage in either of the bilge drain valves is observed, refer to chapter Ref. 51-80-00, P. Block 801 for cleaning procedure.

CAUTION : THE WATER TEMPERATURE SHOULD NOT BE MORE THAN 40° C (104° F).

(e)Flush bilge area with clean and warm water and allow to drain overboard.

CAUTION : THE SURFACE TEMPERATURE SHOULD NOT BE MORE THAN 80° C (176° F).

(f)Dry working area using hot air dryer.

(g)Inspect bilge area for corrosion and remove if evident (Ref. 51-74-10, P. Block 801).

(h)Repair bilge area paint coatings if necessary (Ref. 51-75-10, P. Block 801).

(j)Repair fillet sealing with polysulphide sealant (Mat. No.09-013), where necessary (Ref. 51-76-10, P. Block 801).

(k)Repair fillet sealant overcoat, as required (Ref. 51-76-10, P. Block 801).

(l)Apply moisture-removing oil, (Mat. No. 05-027), thinly to specified areas (Ref. 51-23-20, P. Block 1).

(m)Apply corrosion-preventative compound (Mat. No. 05-005) to all fasteners in working area. (Ref. 51-23-20, P. Block 1).

(n)Remove blanking caps from system supply lines and electrical connectors

(o)Install all system and electrical components previously removed.

(p)Carryout 'Test' and 'Close-Up' procedures

(5)Cleaning with high pressure

CAUTION : AVOID CONTACT OF COMPONENTS WITH WATER AND CLEANING AGENT.

CAUTION : REMOVE OR COVER ALL COMPONENTS IN THE AREA TO BE CLEANED, WHICH COULD BE DAMAGED BY CONTACT WITH WATER AND/OR CLEANING AGENT.

(a)Remove or cover electrical components and systems in the working area, which may come into contact with water and/or cleaning agents.

(b)Cover components with tape (Mat. No. 05-014) and foil (Mat. No. 05-023) if necessary.

R CAUTION : DO NOT USE A METAL SCRAPER TO REMOVE THE UNWANTED MATERIAL.
R A METAL SCRAPER CAN CAUSE DAMAGE TO THE SURFACE OF THE
R COMPONENT.

(c)Using a nonmetallic scraper, remove loose deposits in bilge area.

NOTE : Use an industrial wet and dry vacuum cleaner and/or brush to collect loose deposits.

WARNING : SOME MATERIALS CONTAIN IRRITANTS, WEAR PROTECTIVE CLOTHING, FACE MASK AND PROTECT EYES. IF SKIN OR EYES BECOME AFFECTED, WASH AFFECTED AREA IMMEDIATELY WITH CLEAN WATER AND OBTAIN MEDICAL AID.

WARNING : APPLY MATERIALS IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS, UNLESS OTHERWISE STATED.

WARNING : CLEANING AGENT (MAT. NO. 11-001) IS DANGEROUS.

CAUTION : THE WATER TEMPERATURE SHOULD NOT BE MORE THAN 40° C (104° F).

(d)Apply diluted detergent (Mat. No. 11-001) to bilge structure.

CAUTION : THE PRESSURE IS LIMITED AT THE NOZZLE TO 6 BAR (87 PSI). THE DISTANCE BETWEEN NOZZLE AND SURFACE SHOULD NOT BE LESS THAN 300 MM (11.8 IN.).

(e)Pressure spray diluted detergent (Mat. No. 11-001) using airless pump with spray valve and nozzle.

CAUTION : THE WATER TEMPERATURE SHOULD NOT BE MORE THAN 40° C (104° F).

(f)Rinse working area with clean and warm water.

NOTE : Make certain that rinsing water drains overboard.

NOTE : If a restriction is observed in bilge draining, repeat steps (b) and (d) to remove restriction. Where restriction is observed in any bilge drain valve, refer to chapter 51-80-00, P. Block 701 for cleaning procedure.

(g)Repeat steps (b) to (d) until area is clean.

CAUTION : THE SURFACE TEMPERATURE SHOULD NOT BE MORE THAN 80° C (176° F).

(h)Dry working area using hot air dryer.

(j)Inspect bilge area for corrosion and remove if evident (Ref. 51-74-10, P. Block 801).

(k)Repair bilge area paint coatings if necessary (Ref. 51-75-10, P. Block 801).

(l)Repair fillet sealing with polysulphide sealant (Mat. No. 09-013) where necessary (Ref. 51-76-10, P. Block 801).

(m)Repair fillet sealant overcoat, as required (Ref. 51-76-10, P. Block 801).

(n)Apply moisture-removing oil (Mat. No. 05-027) thinly to specified areas (Ref. 51-23-20, P. Block 1).

(p)Apply corrosion-preventative compound (Mat. No. 05-005) to all fasteners in working area (Ref. 51-23-20, P. Block 1).

(r)Install all system and electrical components previously removed.

(s)Carry out 'Test' and 'Close-Up' procedures.

C. Test
(1)Carry out a function test of all components and systems that were removed and subsequently re-installed.
NOTE : Refer to appropriate system chapter for test procedure.

D. Close-Up
(1)Remove tape (Mat. No. 05-014) and foil (Mat. No. 05-023) if necessary.
(2)Install insulating materials in bilge area.
(3)Install cargo compartment floor panels and ball mats as appropriate. (Ref. 25-52-22, P. Block 401; 53-10-27, P. Block 401; 53-10-29, P. Block 401; 53-10-33, P. Block 401; 53-10-35, P. Block 401).
(4)Ensure that all safety clips and tags are removed and that all circuit breakers are closed.
(5)Close cargo compartment door(s) (Ref. 52-30-00, P. Block 301) and remove access platform(s).

AIRCRAFT FUMIGATION - SERVICING

WARNING : DO NOT BREATHE THE GAS. CARBON DIOXIDE IS POISONOUS AND CAN KILL YOU.

WARNING : BEFORE YOU START THE FUMIGATION PROCEDURE, MAKE SHURE THAT NO PERSONS ARE IN THE AIRCRAFT. THE FUMIGATION GAS CAN CAUSE DEATH.

WARNING : DO NOT OPEN DOORS DURING THE PROCEDURE. POISONOUS GAS IS INSIDE THE AIRCRAFT.

1. Reasons for the Job

A. To kill Rodents in the Aircraft

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform(s) 4.6-5.2 m (15-17 ft.)
B.	Adjustable Platform
C.	Adapter
D.	Additional Fan
E.	Breathing Equipment
F.	Cable Ties
G.	Carbon Dioxide Meter
H.	Outlet Tube (min. dia. 150 mm/6 in.)
J.	Warning Notices
K.	Window Adapter
L. Material No. 08-074	Masking Tape (Ref. 20-31-00)
M. Material No. 14-009	CO2 Gas (Ref. 20-31-00)

Referenced Procedures

- 12-33-21, P. Block 1	Ground Air Pre-Conditioning
- 24-41-00, P. Block 301	AC External Power Control
- 25-25-00, P. Block 1	Passenger Service Units
- 52-10-00, P. Block 301	Passenger/Crew Doors - Special Precautions
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors

3. Procedure

A. Job Set-Up

(1)Safety Precautions

(Ref. Fig. 301, 302)

(a)Make sure that there is sufficient airflow around the aircraft.

(b)Do this job on the apron.

(c)If you do the job in the hangar:

1 Open the door of the hangar.

2 Use an additional fan to blow the gas in the direction of the open door of the hangar.

(d)If you do the job in a hangar which has underfloor areas, make sure that they are sealed.

NOTE : The Carbon-Dioxide gas is heavier than air.

(e)Put warning notices in position to tell persons that fumigation will occur.

(2)Make sure that the attitude of the aircraft is level or nose-up.

(3)Put the access platform in position in front of the RH cockpit sliding window.

(4)Put the adjustable platform in position at zone 170 in front of the outflow valve.

(5)Put the adjustable platform in position at zone 130 in front of the outflow valve.

B. Get access

(1)Open the cockpit door.

(2)Open the RH sliding window in the cockpit.

(3)In the FWD utility area, remove the AFT service-channel filler-panels as necessary to get access (Ref. 25-25-00, P. Block 1).

C. Equipment Installation

(Ref. Fig. 301, 302)

(1)Install the window adapter (1) in the cockpit window frame.

(2)Put the outlet tube (min. dia. 150 mm/6 in.) (2) through the opening in the ceiling.

(3)Push the end of the outlet tube (2) to the highest position in the fuselage and attach it with cable ties.

(4)Connect the outlet tube (2) to the window adapter.

(5)Attach the adapter (3) to the outflow valve.

(6)Connect the supply of the DISINFECTANTS (Material No. 14-009) to the adapter (3).

NOTE : Make sure that all the other outflow valves are closed or covered.

D. Aircraft Maintenance Configuration

(1)Close the crew/passenger door(s).

(2)Close the FWD and AFT cargo compartment doors (Ref. 52-30-00, P. Block 301).

(3)Make sure that all of the pressure-sealed access doors are closed.

(4)Use BONDING AND ADHESIVE COMPOUNDS (Material No. 08-074) to close the drain-ports in the lower fuselage.

E. Fumigation of the Aircraft

WARNING : DO NOT BREATHE THE GAS. CARBON-DIOXIDE IS POISONOUS AND CAN KILL YOU.

WARNING : BEFORE YOU START THE FUMIGATION PROCEDURE, MAKE SHURE THAT NO PERSONS ARE IN THE AIRCRAFT. THE FUMIGATION GAS CAN CAUSE DEATH.

(1)Keep portable breathing equipment prepared for use in the work area.

(2)Put warning notices in position at all doors to tell persons not to open them.

(3)Fill the Pressurized Area with Carbon-Dioxide (CO2).

WARNING : DO NOT OPEN DOORS DURING THE PROCEDURE. POISONOUS GAS IS INSIDE THE AIRCRAFT.

(a)Fill the pressurized area of the aircraft with Carbon-Dioxide. Refer to the table below:
NOTE : Between 4 and 5 hours are necessary to fill the pressurized area.

	Aircraft Type	
	A310	A300-600
required amount of Carbon-Dioxide (CO2)	1700kg	2000kg

(4)Wait 30 minutes before you disconnect the supply of Carbon-Dioxide.
(5)Disconnect the supply of Carbon-Dioxide.

F. Get Access
WARNING : DO NOT BREATHE THE GAS. CARBON-DIOXIDE IS POISONOUS AND CAN KILL YOU.

(1)Examine the cabin pressure indicators at the crew/passenger doors and make sure that the aircraft cabin is not pressurized.
(2)Open the FWD and AFT compartment doors (Ref. 52-30-00, P. Block 301.
(3)Open the pressure-sealed access doors.
(4)Open all crew/passenger doors.

G. Energize the ground service network (Ref. 24-41-00, P. Block 301)

H. Ground air pre-conditioning
(1)Start the ground air pre-conditioning, and operate it for min. 30 minutes to remove the Carbon-Dioxide (Ref. 12-33-21, P. Block 1).
(2)Use a carbon-dioxide meter and examine the aircraft for remaining Carbon-Dioxide. Make sure that there is less than 5 Vol. % Carbon-Dioxide concentration 0.2 m (0.65 ft.) above the cabin floor level.

4. Close-Up

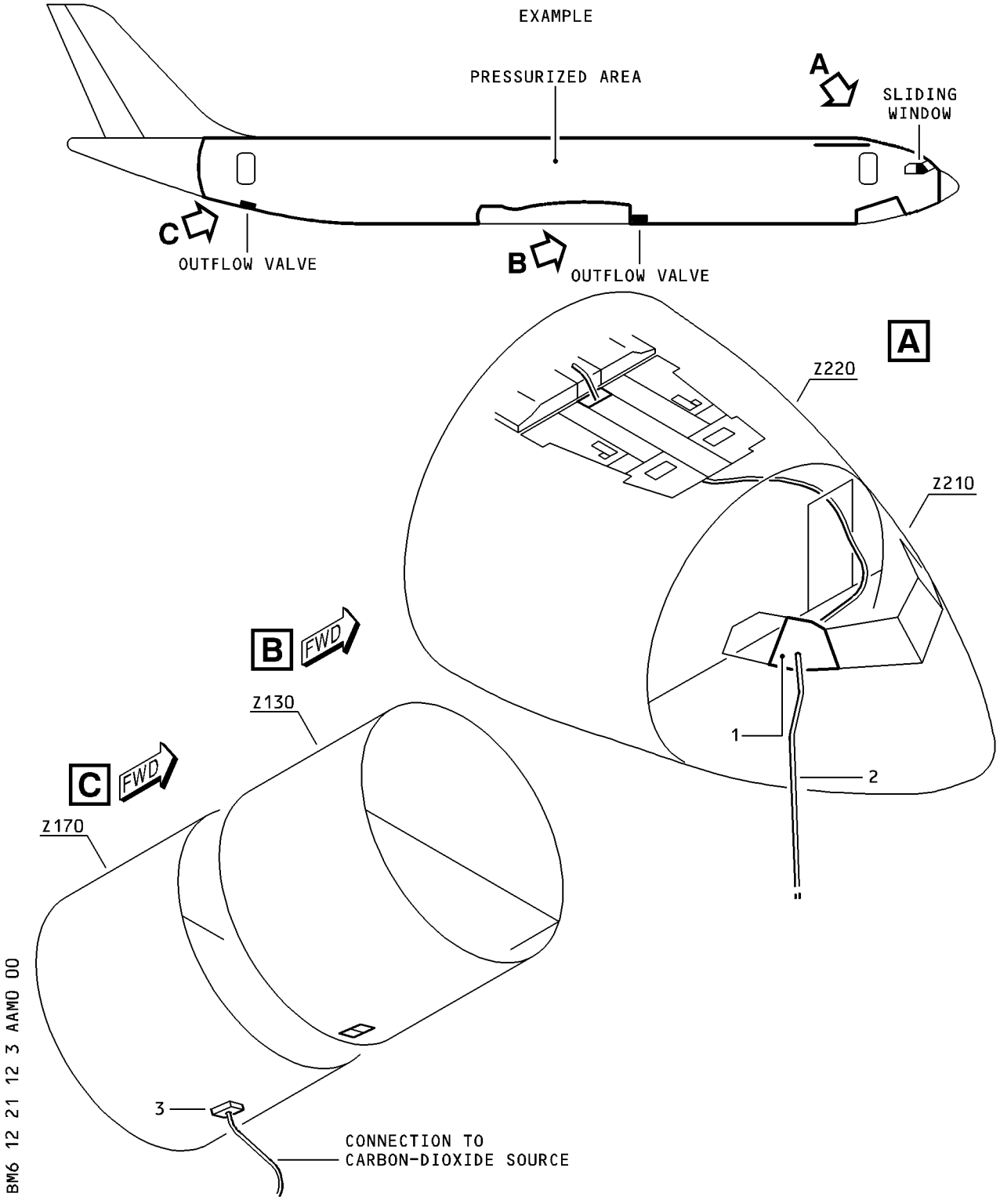
A. Removal of Equipment
(Ref. Fig. 301, 302)
(1)Remove the supply of Carbon-Dioxide and the adapter (3).
(2)Remove the outlet tube (2) and the adapter (1).

B. Removal of the Ground Support
(1)Remove the access platforms.
(2)Remove the warning notice(s).
(3)Open the sealed areas if you did the task in a hangar with underfloor areas.
(4)Use a Carbon-Dioxide meter and examine the hangar for remaining Carbon-Dioxide. Make sure that there is less than 5 Vol. % Carbon-Dioxide concentration 0.2 m (0.65 ft.) above the floor of the underfloor areas

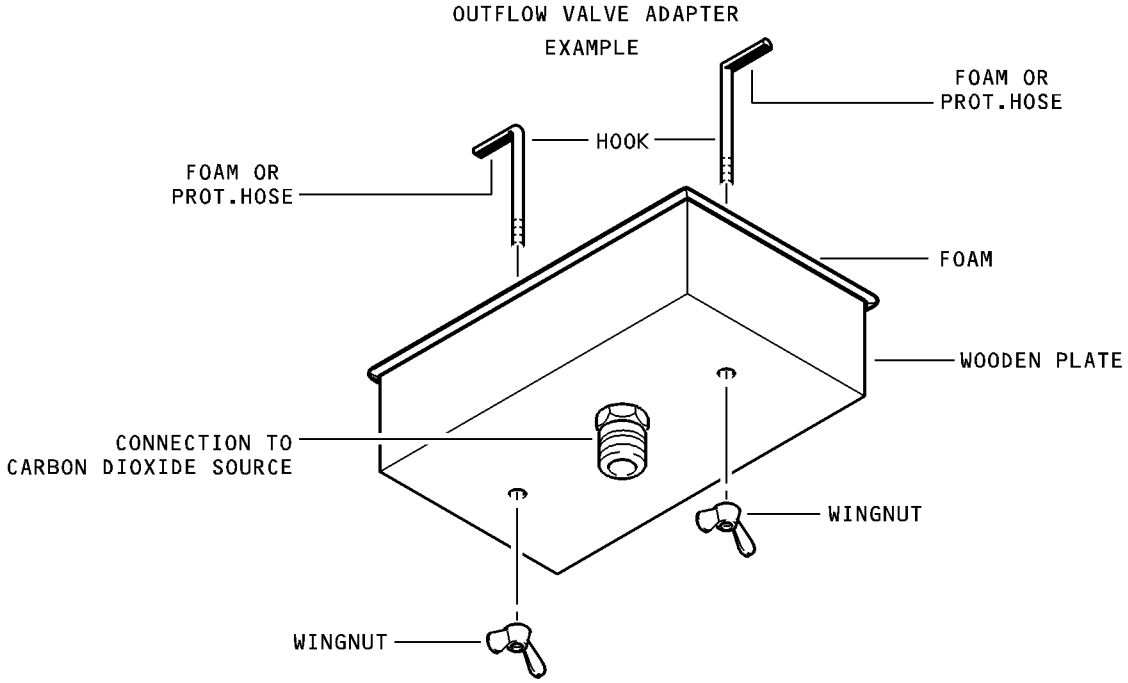
of the hangar.

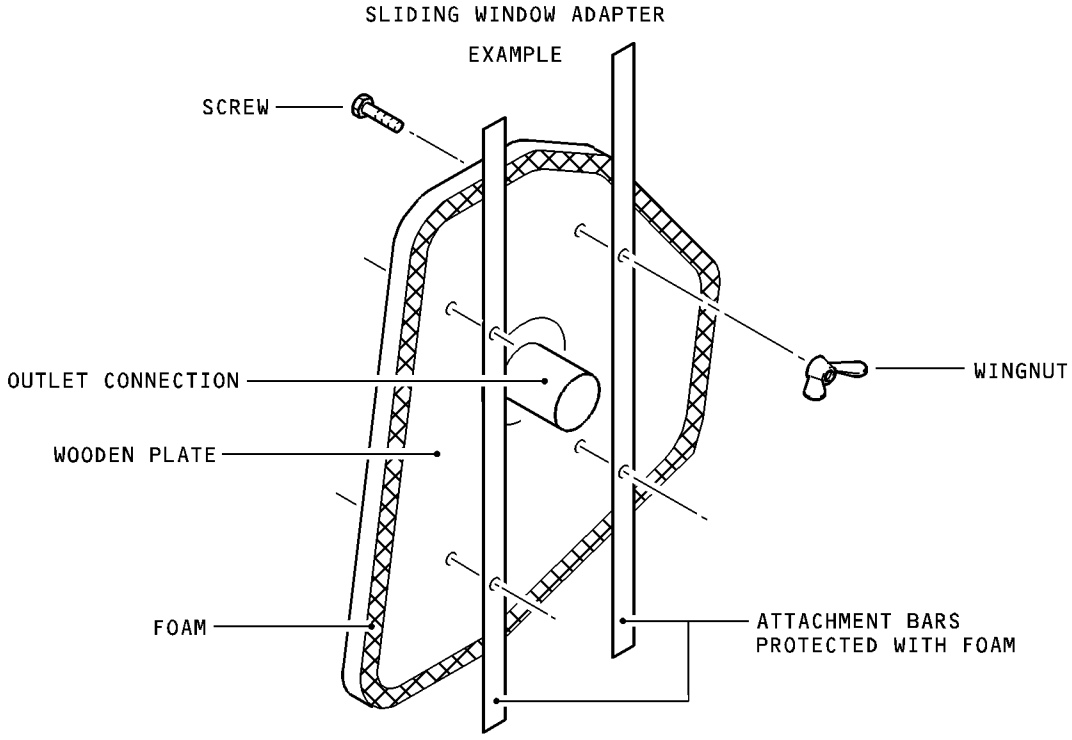
C. Close Access
(1)Remove the tape from the drain-ports.
(2)In the FWD utility area install the service-channel filler-panels (Ref. 25-25-00, P. Block 1).
(3)Wait 1 hour before you close all the doors.
(4)Close the RH cockpit sliding window.
(5)Make sure that the work area is clean and clear of tools and other items.
(6)Close the cockpit door.
(7)Close the FWD and AFT cargo compartment doors (Ref. 52-30-00, P. Block 301).
(8)Close the pressure-sealed access doors.
(9)If necessary close the crew/passenger door(s).

D. De-energize the ground service network (Ref. 24-41-00, P. Block 301).



Aircraft Fumigation
Figure 301





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Fumigation Adapter
Figure 302

1. Cleaning of the Avionics Compartment and of the Flight Compartment

A. Reason for the Job

To remove the dust from the avionics compartment and from the flight compartment (panels 3VU, 4VU, 5VU, 8VU and 11VU).

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Soft Brush
(2)	Vacuum Cleaner
(3)Material No. 19-003	Miscellaneous (Ref. 20-31-00)
Referenced Procedures	
- 21-31-11, P. Block 401	Cabin Pressure Controller 105HM (106HM)
- 21-61-15, P. Block 401	Pack Temperature Controller
- 21-61-16, P. Block 401	APU and Pack Temperature Demand Controller 37HK
- 21-63-11, P. Block 401	Zone Temperature Controller 19HK (17HK, 18HK, 20HK)
- 21-64-13, P. Block 401	Cargo Compartment Temperature Controller 54HN, 15HN
- 22-18-34, P. Block 401	Flight Control Computer (301CA1, 301CA2)
- 22-26-34, P. Block 401	Flight Augmentation Computer (301CC1, 301CC2)
- 22-36-34, P. Block 401	Thrust Control Computer (TCC) (301CJ1, 301CJ2)
- 23-11-33, P. Block 401	HF Transceiver
- 23-12-13, P. Block 401	VHF Control Unit (2RC1, 2RC2)
- 23-12-33, P. Block 401	VHF Transceiver (1RC1, 1RC2, 1RC3)
- 23-22-34, P. Block 401	SELCAL Decoder (1RW)
- 23-24-14, P. Block 401	ACARS Dual Function Interactive Display Unit (DFIDU) (16RB)
- 23-24-33, P. Block 401	ACARS Management Unit (1RB)
- 23-24-51, P. Block 401	ACARS Printer (35RB)
- 23-31-18, P. Block 401	Passenger Address Amplifier
- 23-32-12, P. Block 401	Tape Reproducer
- 23-33-12, P. Block 401	Audio Reproducer (10MK)
- 23-33-15, P. Block 401	Main Multiplexer (8MK)
- 23-51-12, P. Block 401	Audio Control Panel (2RN, 3RN)
- 24-41-00, P. Block 301	A/C External Power Control
- 24-41-11, P. Block 401	Ground Power Control Unit
- 26-12-11, P. Block 401	Engine Fire Detection Control Unit
- 26-13-11, P. Block 401	APU Fire and Overheat Detection Control Unit
- 27-14-17, P. Block 401	Jamming Detection Control Unit (4CB)
- 27-23-26, P. Block 401	Feel and Limitation Computer (302CY1, 302CY2)
- 27-51-18, P. Block 401	Slat/Flap Control Computer (21CV and 22CV)
- 27-61-34, P. Block 401	Electrical Flight Control Unit (EFCU)

ITEM	DESIGNATION
	1CP (2CP)
- 28-42-38, P. Block 401	Fuel Quantity Computer
- 28-46-23, P. Block 401	Fuel level Amplifier
- 31-31-15, P. Block 401	DFDAMU (Digital Flight Data Acquisition and Management Unit) 2TU
- 31-32-65, P. Block 401	Quick Access Recorder 56TU
- 31-32-68, P. Block 401	QAR Cassette
- 31-32-75, P. Block 401	Digital AIDS Recorder (DAR) 60TU
- 31-32-78, P. Block 401	DAR Cassette
- 31-46-11, P. Block 401	Center of Gravity Control Computer (1GU)
- 31-53-34, P. Block 401	Flight Warning Computer (1WW1, 1WW2)
- 31-55-22, P. Block 401	System Data Analog Converter (SDAC) (1WV)
- 31-57-11, P. Block 401	ECAM Control Panel 5WT
- 31-57-22, P. Block 401	L (R) ECAM Display Unit 1WT (3WT)
- 31-57-34, P. Block 401	ECAM SGU 9WT1 (9WT2, 9WT3)
- 32-31-71, P. Block 401	Proximity Detector Processing Unit (54GB)
- 32-42-72, P. Block 401	Brake System Control Unit (29GG)
- 32-47-25, P. Block 401	Brake Temperature Detector Unit (16GW)
- 32-49-31, P. Block 401	Tire Pressure Indicating Computer (2GV)
- 33-16-11, P. Block 401	Annunciator Light Dimmer
- 34-11-34, P. Block 401	Air Data Computer (1FL1, 1FL2)
- 34-36-15, P. Block 401	ILS Control Box (34RT)
- 34-36-31, P. Block 401	ILS Receiver (1RT1, 1RT2)
- 34-41-12, P. Block 401	Radar Control Box 3SQ
- 34-41-33, P. Block 401	Weather Radar Transceiver (1SQ1)
- 34-43-34, P. Block 401	Automatic Call Out Box (2WK)
- 34-48-11, P. Block 401	Ground Proximity Warning Computer (1WZ)
- 34-51-33, P. Block 401	DME Interrogator 1SD1 (1SD2)
- 34-52-13, P. Block 401	ATC Control Unit 4SH
- 34-52-33, P. Block 401	ATC Transponder 1SH1 (1SH2)
- 34-53-13, P. Block 401	ADF Control Unit 3RP1 (3RP2)
- 34-53-31, P. Block 401	ADF Receiver 1RP1 (1RP2)
- 34-55-13, P. Block 401	VOR/DME Control Unit 3RS1 (3RS2)
- 34-55-31, P. Block 401	VOR/MKR Receiver 301RS1 (301RS2)
- 34-68-11, P. Block 401	FMS CDU (3CK1, 3CK2)
- 34-68-34, P. Block 401	Flight Management Computer (1CK1, 1CK2)
- 34-73-34, P. Block 401	EFIS SGU (28FN1, 28FN2, 28FN3)
- 34-74-22, P. Block 401	Primary Flight Display 34FN1 (34FN2)
- 34-75-22, P. Block 401	Navigation Display 36FN1 (36FN2)
- 35-12-22, P. Block 401	Oxygen Control Unit (19HT)
- 36-11-19, P. Block 401	Pneumatic Controller 41HA (42HA)
- 36-22-11, P. Block 401	Overheat Detection Controller
- 77-32-02, P. Block 401	Engine Vibration Accelerometer

C. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Open the access door 121BL.
(3)Removal of the units in the flight compartment.

(Ref. Fig. 701)

(a)On the CAPT main instrument panel 3VU :
- remove the display unit (34FN1) (Ref. 34-74-22, P. Block 401),
- remove the display unit (36FN1) (Ref. 34-75-22, P. Block 401).

(b)On the upper center instrument panel 4VU :
- remove the display units (1WT) and (3WT) (Ref. 31-57-22, P. Block 401).

(c)On the F/O main instrument panel 5VU :
- remove the display unit (34FN2) (Ref. 34-74-22, P. Block 401),
- remove the display unit (36FN2) (Ref. 34-75-22, P. Block 401).

(d)On the lower center instrument panel 8VU, remove :
- the FMS CDUs (3CK1) and (3CK2) (Ref. 34-68-11, P.Block 401),
- the VOR/DME control units (3RS1) and (3RS2) (Ref. 34-55-13, P. Block 401),
- the ILS control box (34RT) (Ref. 34-36-15, P. Block 401).

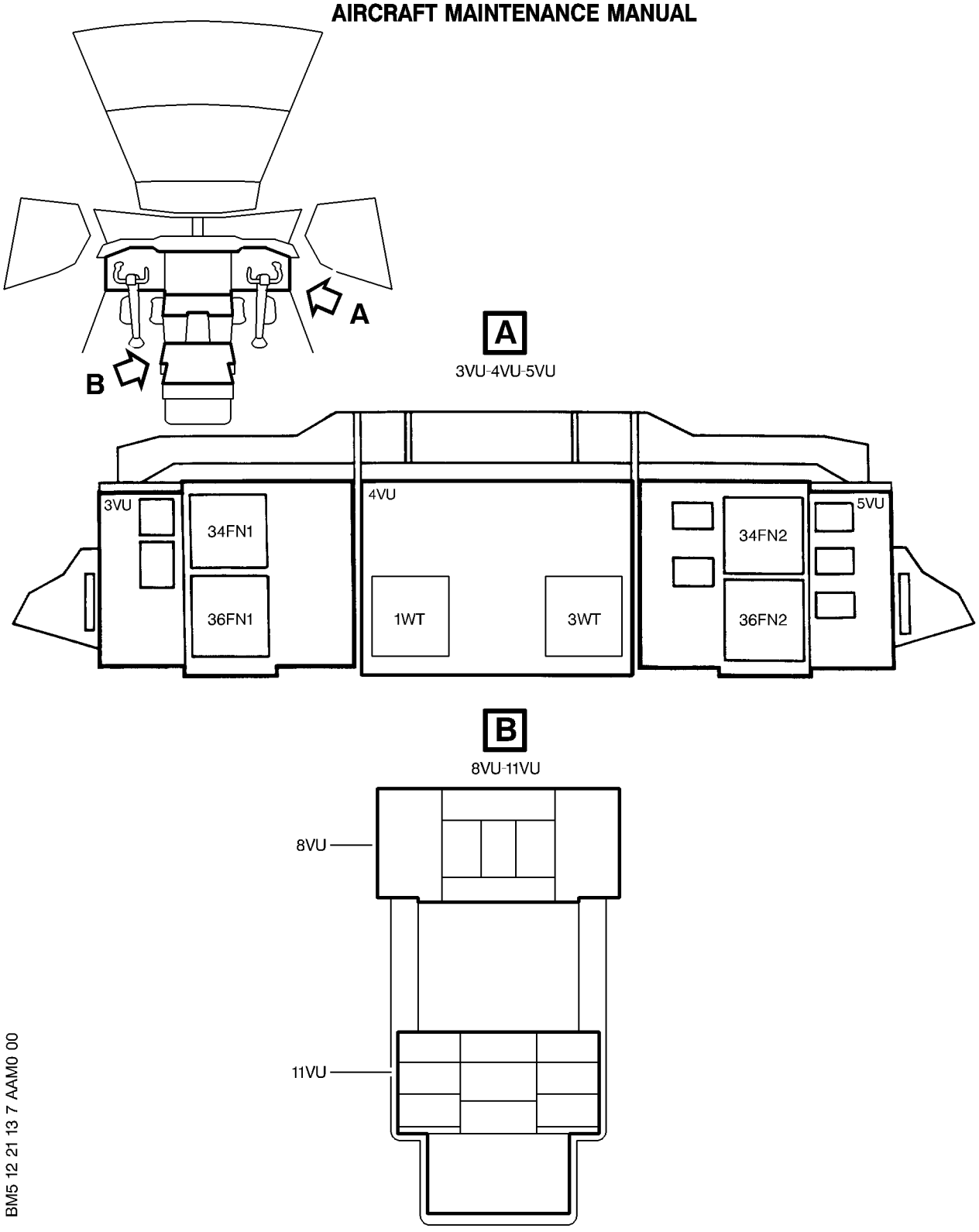
(e)On the electrical center pedestal 11VU, remove :
- the VHF control units (2RC1) and (2RC2) (Ref. 23-12-13, P. Block 401),
- the Audio Control Panels (2RN) and (3RN) (Ref. 23-51-12, P. Block 401),
- the ADF control units (3RP1) and (3RP2) (Ref. 34-53-13, P. Block 401) if installed,
- the ECAM control panel (5WT) (Ref. 31-57-11, P. Block 401),
- the ATC control unit (4SH) (Ref. 34-52-13, P. Block 401),
- the radar control box (3SQ) (Ref. 34-41-12, P. Block 401),
- the ACARS printer (35RB) (Ref. 23-24-51, P. Block 401) if installed,
- the ACARS Dual Function Interactive Display Unit (DFIDU) (16RB) (Ref. 23-24-14, P. Block 401) if installed.

(3)Removal of the computers in the avionics compartment :

(Ref. Fig. 702)

(a)On the shelf 81VU :
- remove the Ground Power Control Unit (7XG) (Ref. 24-41-11, P. Block 401) if installed,
- remove the Thrust Control Computer (TCC) 3 (301CJ2) (Ref. 22-36-34, P. Block 401) if installed,
- remove the VHF3 transceiver (1RC3) (Ref. 23-12-33, P. BlocK 401) if installed,
- remove the ACARS management unit (1RB) (Ref. 23-24-33, P. Block 401) if installed,
- remove the SELCAL decoder (1RW) (Ref. 23-22-34, P. Block 401),
- remove the Thrust Control Computer (TCC) 1 (301CJ1) (Ref. 22-36-34, P. Block 401).

(b)On the shelf 82VU :
- remove the tape reproducer (9RX) (Ref. 23-32-12, P. Block 401) if installed,
- remove the audio reproducer (10MK) (Ref. 23-33-12, P. Block 401) if installed,
- remove the main multiplexer (8MK) (Ref. 23-33-15, P. Block 401) if installed,
- remove the Quick Access Recorder (56TU) (Ref. 31-32-65, P. Block 401)



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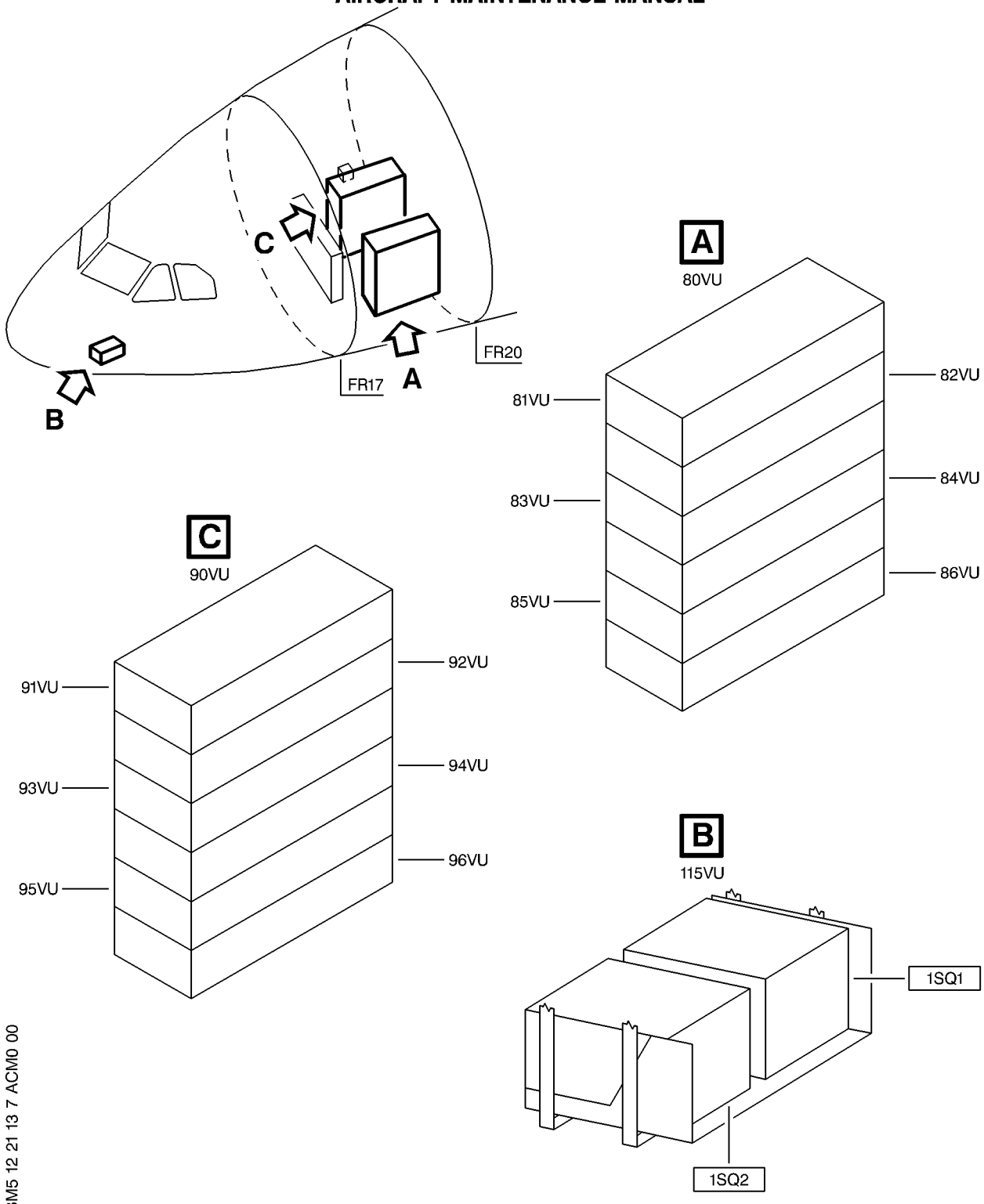
Location of Units in the Flight Compartment
(Panels 3VU, 4VU, 5VU, 8VU and 11VU)
Figure 701



Location of Shelves and Computers
in the Avionics Compartment
Figure 702

or the QAR Cassette (56TU1) (Ref. 31-32-68, P. Block 401) if installed,
- remove the Digital AIDS Recorder (DAR) (60TU) (Ref. 31-32-75, P. Block 401) or the DAR Cassette (61TU1) (Ref. 31-32-78, P. Block 401) if installed,
- remove the Digital Interface Unit (192MM) if installed.

(c)On the shelf 83VU :
- remove the feel and limitation computer 1 (302CY1) (Ref. 27-23-26, P. Block 401),
- remove the Flight Management Computer 1 (1CK1) (Ref. 34-68-34, P. Block 401),
- remove the Flight Augmentation Computer 1 (301CC1) (Ref. 22-26-34, P. Block 401),
- remove the Flight Control Computer 1 (301CA1) (Ref. 22-18-34, P. Block 401),
- remove the ADF1 receiver (1RP1) (Ref. 34-53-31, P. Block 401).

(d)On the shelf 84VU :
- remove the feel and limitation computer 2 (302CY2) (Ref. 27-23-26, P. Block 401),
- remove the Flight Management Computer 2 (1CK2) (Ref. 34-68-34, P. Block 401),
- remove the Flight Augmentation Computer 2 (301CC2) (Ref. 22-26-34, P. Block 401),
- remove the Flight Control Computer 2 (301CA2) (Ref. 22-18-34, P. Block 401),
- remove the ADF2 receiver (1RP2) (Ref. 34-53-31, P. Block 401).

(e)On the shelf 85VU :
- remove the EFIS SGU 3 (28FN3) (Ref. 34-73-34, P. Block 401),
- remove the ATC1 transponder (1SH1) (Ref. 34-52-33, P. Block 401),
- remove the DME1 interrogator (1SD1) (Ref. 34-51-33, P. Block 401),
- remove the EFIS SGU 1 (28FN1) (Ref. 34-73-34, P. Block 401),
- remove the VOR1 receiver (301RS1) (Ref. 34-55-31, P. Block 401),
- remove the ILS1 receiver (1RT1) (Ref. 34-36-31, P. Block 401).

(f)On the shelf 86VU :
- remove the Air Data Computer 2 (1FL2) (Ref. 34-11-34, P. Block 401),
- remove the Ground Proximity Warning Computer (1WZ) (Ref. 34-48-11, P. Block 401),
- remove the ATC2 transponder (1SH2) (Ref. 34-52-33, P. Block 401),
- remove the DME2 interrogator (1SD2) (Ref. 34-51-33, P. Block 401),
- remove the EFIS SGU 2 (28FN2) (Ref. 34-73-34, P. Block 401),
- remove the VOR2 receiver (301RS2) (Ref. 34-55-31, P. Block 401),
- remove the ILS2 receiver (1RT2) (Ref. 34-36-31, P. Block 401),
- remove the VHF2 transceiver (1RC2) (Ref. 23-12-33, P. Block 401).

(g)On the shelf 91VU :
- remove the pneumatic controller 2 (42HA) (Ref. 36-11-19, P. Block 401),
- remove the AFT cabin temperature controller (20HK) (Ref. 21-63-11, P. Block 401),
- remove the pack 2 temperature controller (10HH) (Ref. 21-61-15, P. Block 401),
- remove the overheat detection controller (12HF) (Ref. 36-22-11,

P. Block 401),
- remove the APU fire and overheat detection control unit (13WG) (Ref. 26-13-11, P. Block 401) if installed,
- remove the cargo compartment temperature controller (15HN) (Ref. 21-64-13, P. Block 401) if installed,
- remove the APU and pack temperature demand controller (37HK) (Ref. 21-61-16, P. Block 401),
- remove the FWD and MID cabin temperature controllers (18HK) and (19HK) (Ref. 21-63-11, P. Block 401),
- remove the flight compartment temperature controller (17HK) (Ref. 21-63-11, P. Block 401),
- remove the pack 1 temperature controller (11HH) (Ref. 21-61-15, P. Block 401),
- remove the cargo compartment temperature controller (54HN) (Ref. 21-64-13, P. Block 401) if installed,
- remove the overheat detection controller (13HF) (Ref. 36-22-11, P. Block 401).

(h)On the shelf 92VU :
- remove the Flight Warning Computer 1 (1WW1) (Ref. 31-53-34, P. Block 401),
- remove the ECAM SGU 1 (9WT1) (Ref. 31-57-34, P. Block 401),
- remove the automatic call out box (2WK) (Ref. 34-43-34, P. Block 401) if installed,
- remove the Electrical Flight Control Unit (EFCU) 1 (1CP) (Ref. 27-61-34, P. Block 401),
- remove the Slat/Flap Control Computer 1 (21CV) (Ref. 27-51-18, P. Block 401),
- remove the cabin pressure controller 2 (106HM) (Ref. 21-31-11, P. Block 401).
- remove the fuel quantity computer (15QT) (Ref. 28-42-38, P. Block 401).

(j)On the shelf 93VU :
- remove the Flight Warning Computer 2 (1WW2) (Ref. 31-53-34, P. Block 401),
- remove the ECAM SGU 2 (9WT2) (Ref. 31-57-34, P.Block 401),
- remove the Electrical Flight Control Unit (EFCU) 2 (2CP) (Ref. 27-61-34, P. Block 401),
- remove the Slat/Flap Control Computer 2 (22CV) (Ref. 27-51-18, P. Block 401),
- remove the jamming detection control unit (4CB) (Ref. 27-14-17, P. Block 401),
- remove the proximity detector processing unit (54GB) (Ref. 32-31-71, P. Block 401).

(k)On the shelf 94VU :
- remove the System Data Analog Converter (SDAC) (1WV) (Ref. 31-55-22, P. Block 401),
- remove the Digital Flight Data Acquisition and Management Unit (DFDAMU) (2TU) (Ref. 31-31-15, P. Block 401),
- remove the Brake System Control Unit (29GG) (Ref. 32-42-72, P. Block 401),
- remove the brake temperature detector unit (16GW) (Ref. 32-47-25,

P. Block 401),
- remove the annunciator light dimmer (1LT) (Ref. 33-16-11, P. Block 401),
- remove the Center of Gravity Control Computer (1GU) (Ref. 31-46-11, P. Block 401) if installed.

(l)On the shelf 95VU :
- remove the HF1 transceiver (1RE1) (Ref. 23-11-33, P. Block 401),
- remove the tire pressure indicating computer (2GV) (Ref. 32-49-31, P. Block 401) if installed,
- remove the engine vibration accelerometer (3EV) (Ref. 77-32-02, P. Block 401) if installed,
- remove the HF2 transceiver (1RE2) (Ref. 23-11-33, P. Block 401),
- remove the passenger address amplifier 2 (2RY) (Ref. 23-31-18, P. Block 401) if installed,
- remove the ECAM SGU 3 (9WT3) (Ref. 31-57-34, P. Block 401) if installed,
- remove the passenger address amplifier 3 (151RY) (Ref. 23-31-18, P. Block 401) if installed.

(m)On the shelf 96VU :
- remove the cabin pressure controller 1 (105HM) (Ref. 21-31-11, P. Block 401),
- remove the fuel level amplifier (8QJ) (Ref. 28-46-23, P. Block 401),
- remove the VHF1 transceiver (1RC1) (Ref. 23-12-33, P. Block 401),
- remove the oxygen control unit (19HT) (Ref. 35-12-22, P. Block 401),
- remove the engine fire detection control units 1 and 2 (11WD and 12WD) (Ref. 26-12-11, P. Block 401),
- remove the passenger address amplifier 1 (1RY) (Ref. 23-31-18, P. Block 401),
- remove the cargo smoke detection control unit (18WH) if installed,
- remove the pneumatic controller (41HA) (Ref. 36-11-19, P. Block 401),
- remove the Air Data Computer 1 (1FL1) (Ref. 34-11-34, P. Block 401).

(n)On the shelf 115VU :
- remove the weather radar transceivers 1 and 2 (1SQ1 and 1SQ2) (Ref. 34-41-33, P. Block 401) if installed.

(4)Removal of the rack plates
(Ref. Fig. 702)

(a)On the shelves 81VU, 82VU, 83VU, 84VU, 85VU, 86VU, 91VU, 92VU, 93VU, 94VU, 95VU, 96VU and 115VU
- remove the rack plates.

D. Procedure

(1)Cleaning of the avionics compartment and of the flight compartment (Panels 3VU, 4VU, 5VU, 8VU and 11VU).

(a)Use a vacuum cleaner and a soft brush or a lint-free cotton cloth (Material No. 19-003) and clean :

1 the area where the units and computers were installed
2 the area where the rack plates were installed
3 all the faces of the removed units and computers
4 the avionics compartment

5 the ducts
6 the shelves.
NOTE : Keep the vacuum cleaner out of the avionics compartment to prevent new dust contamination in the avionics compartment.

E. Close-Up
(1)Installation of the units in the flight compartment.
(Ref. Fig. 701)
R NOTE : For computers with loadable software, software loading is not
R necessary if you install the computer removed for access.
(a)On the CAPT main instrument panel 3VU :
- install the display unit (34FN1) (Ref. 34-74-22, P. Block 401),
- install the display unit (36FN1) (Ref. 34-75-22, P. Block 401).
(b)On the upper center instrument panel 4VU :
- install the display units (1WT) and (3WT) (Ref. 31-57-22, P. Block 401).
(c)On the F/O main instrument panel 5VU :
- install the display unit (34FN2) (Ref. 34-74-22, P. Block 401),
- install the display unit (36FN2) (Ref. 34-75-22, P. Block 401).
(d)On the lower center instrument panel 8VU, install :
- the FMS CDUs (3CK1) and (3CK2) (Ref. 34-68-11, P. Block 401),
- the VOR/DME control units (3RS1) and (3RS2) (Ref. 34-55-13, P. Block 401),
- the ILS control box (34RT) (Ref. 34-36-15, P. Block 401).
(e)On the electrical center pedestal 11VU, install :
- the VHF control units (2RC1) and (2RC2) (Ref. 23-12-13, P. Block 401),
- the Audio Control Panels (2RN) and (3RN) (Ref. 23-51-12, P. Block 401),
- the ADF control units (3RP1) and (3RP2) (Ref. 34-53-13, P. Block 401) if removed,
- the ECAM control panel (5WT) (Ref. 31-57-11, P. Block 401),
- the ATC control unit (4SH) (Ref. 34-52-13, P. Block 401),
- the radar control box (3SQ) (Ref. 34-41-12, P. Block 401),
- the ACARS printer (35RB) (Ref. 23-24-51, P. Block 401) if removed,
- the ACARS Dual Function Interactive Display Unit (DFIDU) (16RB) (Ref. 23-24-14, P. Block 401) if removed.
(3)Installation of the rack plates
(Ref. Fig. 702)
(a)On the shelves 81VU, 82VU, 83VU, 84VU, 85VU, 86VU, 91VU, 92VU, 93VU, 94VU, 95VU, 96VU and 115VU
- install the rack plates.
(4)Installation of the computers in the avionics compartment :
(Ref. Fig. 702)
R NOTE : For computers with loadable software, software loading is not
R necessary if you install the computer removed for access.
(a)On the shelf 81VU :
- install the Ground Power Control Unit (7XG) (Ref. 24-41-11, P. Block 401) if removed,
- install the Thrust Control Computer (TCC) 3 (301CJ2) (Ref. 22-36-34,

P. Block 401) if removed,
- install the VHF3 transceiver (1RC3) (Ref. 23-12-33, P. BlocK 401) if removed,
- install the ACARS management unit (1RB) (Ref. 23-24-33, P. Block 401) if removed,
- install the SELCAL decoder (1RW) (Ref. 23-22-34, P. Block 401),
- install the Thrust Control Computer (TCC) 1 (301CJ1) (Ref. 22-36-34, P. Block 401).

(b)On the shelf 82VU :
- install the tape reproducer (9RX) (Ref. 23-32-12, P. Block 401) if removed,
- install the audio reproducer (10MK) (Ref. 23-33-12, P. Block 401) if removed,
- install the main multiplexer (8MK) (Ref. 23-33-15, P. Block 401) if removed,
- install the Quick Access Recorder (56TU) (Ref. 31-32-65, P. Block 401) or QAR Cassette (56TU1) (Ref. 31-32-68, P. Block 401) if removed,
- install the Digital AIDS Recorder (DAR) (60TU) (Ref. 31-32-75, P. Block 401) or DAR Cassette (61TU1) (Ref. 31-32-78, P. Block 401) if removed,
- install the Digital Interface Unit (192MM) if removed.

(c)On the shelf 83VU :
- install the feel and limitation computer 1 (302CY1) (Ref. 27-23-26, P. Block 401),
- install the Flight Management Computer 1 (1CK1) (Ref. 34-68-34, P. Block 401),
- install the Flight Augmentation Computer 1 (301CC1) (Ref. 22-26-34, P. Block 401),
- install the Flight Control Computer 1 (301CA1) (Ref. 22-18-34, P. Block 401),
- install the ADF1 receiver (1RP1) (Ref. 34-53-31, P. Block 401).

(d)On the shelf 84VU :
- install the feel and limitation computer 2 (302CY2) (Ref. 27-23-26, P. Block 401),
- install the Flight Management Computer 2 (1CK2) (Ref. 34-68-34, P. Block 401),
- install the Flight Augmentation Computer 2 (301CC2) (Ref. 22-26-34, P. Block 401),
- install the Flight Control Computer 2 (301CA2) (Ref. 22-18-34, P. Block 401),
- install the ADF2 receiver (1RP2) (Ref. 34-53-31, P. Block 401).

(e)On the shelf 85VU :
- install the EFIS SGU 3 (28FN3) (Ref. 34-73-34, P. Block 401),
- install the ATC1 transponder (1SH1) (Ref. 34-52-33, P. Block 401),
- install the DME1 interrogator (1SD1) (Ref. 34-51-33, P. Block 401),
- install the EFIS SGU 1 (28FN1) (Ref. 34-73-34, P. Block 401),
- install the VOR1 receiver (301RS1) (Ref. 34-55-31, P. Block 401),
- install the ILS1 receiver (1RT1) (Ref. 34-36-31, P. Block 401).

(f)On the shelf 86VU :
- install the Air Data Computer 2 (1FL2) (Ref. 34-11-34, P. Block 401),

- install the Ground Proximity Warning Computer (1WZ) (Ref. 34-48-11, P. Block 401),
- install the ATC2 transponder (1SH2) (Ref. 34-52-33, P. Block 401),
- install the DME2 interrogator (1SD2) (Ref. 34-51-33, P. Block 401),
- install the EFIS SGU 2 (28FN2) (Ref. 34-73-34, P. Block 401),
- install the VOR2 receiver (301RS2) (Ref. 34-55-31, P. Block 401),
- install the ILS2 receiver (1RT2) (Ref. 34-36-31, P. Block 401),
- install the VHF2 transceiver (1RC2) (Ref. 23-12-33, P. Block 401).

(g)On the shelf 91VU :

- install the pneumatic controller 2 (42HA) (Ref. 36-11-19, P. Block 401),
- install the AFT cabin temperature controller (20HK) (Ref. 21-63-11, P. Block 401),
- install the pack 2 temperature controller (10HH) (Ref. 21-61-15, P. Block 401),
- install the overheat detection controller (12HF) (Ref. 36-22-11, P. Block 401),
- install the APU fire and overheat detection control unit (13WG) (Ref. 26-13-11, P. Block 401) if removed,
- install the cargo compartment temperature controller (15HN) (Ref. 21-64-13, P. Block 401) if removed,
- install the APU and pack temperature demand controller (37HK) (Ref. 21-61-16, P. Block 401),
- install the FWD and MID cabin temperature controllers (18HK) and (19HK) (Ref. 21-63-11, P. Block 401),
- install the flight compartment temperature controller (17HK) (Ref. 21-63-11, P. Block 401),
- install the pack 1 temperature controller (11HH) (Ref. 21-61-15, P. Block 401),
- install the cargo compartment temperature controller (54HN) (Ref. 21-64-13, P. Block 401) if removed,
- install the overheat detection controller (13HF) (Ref. 36-22-11, P. Block 401).

(h)On the shelf 92VU :

- install the Flight Warning Computer 1 (1WW1) (Ref. 31-53-34, P. Block 401),
- install the ECAM SGU 1 (9WT1) (Ref. 31-57-34, P. Block 401),
- install the automatic call out box (2WK) (Ref. 34-43-34, P. Block 401) if removed,
- install the Electrical Flight Control Unit (EFCU) 1 (1CP) (Ref. 27-61-34, P. Block 401),
- install the Slat/Flap Control Computer 1 (21CV) (Ref. 27-51-18, P. Block 401),
- install the cabin pressure controller 2 (106HM) (Ref. 21-31-11, P. Block 401).
- install the fuel quantity computer (15QT) (Ref. 28-42-38, P. Block 401).

(j)On the shelf 93VU :

- install the Flight Warning Computer 2 (1WW2) (Ref. 31-53-34, P. Block 401),
- install the ECAM SGU 2 (9WT2) (Ref. 31-57-34, P.Block 401),

- install the Electrical Flight Control Unit (EFCU) 2 (2CP) (Ref. 27-61-34, P. Block 401),
- install the Slat/Flap Control Computer 2 (22CV) (Ref. 27-51-18, P. Block 401),
- install the jamming detection control unit (4CB) (Ref. 27-14-17, P. Block 401),
- install the proximity detector processing unit (54GB) (Ref. 32-31-71, P. Block 401).

(k)On the shelf 94VU :

- install the System Data Analog Converter (SDAC) (1WV) (Ref. 31-55-22, P. Block 401),
- install the Digital Flight Data Acquisition and Management Unit (DFDAMU) (2TU) (Ref. 31-31-15, P. Block 401),
- install the Brake System Control Unit (29GG) (Ref. 32-42-72, P. Block 401),
- install the brake temperature detector unit (16GW) (Ref. 32-47-25, P. Block 401),
- install the annunciator light dimmer (1LT) (Ref. 33-16-11, P. Block 401),
- install the Center of Gravity Control Computer (1GU) (Ref. 31-46-11, P. Block 401) if removed.

(l)On the shelf 95VU :

- install the HF1 transceiver (1RE1) (Ref. 23-11-33, P. Block 401),
- install the tire pressure indicating computer (2GV) (Ref. 32-49-31, P. Block 401) if removed,
- install the engine vibration accelerometer (3EV) (Ref. 77-32-02, P. Block 401) if removed,
- install the HF2 transceiver (1RE2) (Ref. 23-11-33, P. Block 401),
- install the passenger address amplifier 2 (2RY) (Ref. 23-31-18, P. Block 401) if removed,
- install the ECAM SGU 3 (9WT3) (Ref. 31-57-34, P. Block 401) if removed,
- install the passenger address amplifier 3 (151RY) (Ref. 23-31-18, P. Block 401) if removed.

(m)On the shelf 96VU :

- install the cabin pressure controller 1 (105HM) (Ref. 21-31-11, P. Block 401),
- install the fuel level amplifier (8QJ) (Ref. 28-46-23, P. Block 401),
- install the VHF1 transceiver (1RC1) (Ref. 23-12-33, P. Block 401),
- install the oxygen control unit (19HT) (Ref. 35-12-22, P. Block 401),
- install the engine fire detection control units 1 and 2 (11WD and 12WD) (Ref. 26-12-11, P. Block 401),
- install the passenger address amplifier 1 (1RY) (Ref. 23-31-18, P. Block 401),
- install the cargo smoke detection control unit (18WH) if removed,
- install the pneumatic controller (41HA) (Ref. 36-11-19, P. Block 401),
- install the Air Data Computer 1 (1FL1) (Ref. 34-11-34, P. Block 401).

(n)On the shelf 115VU :

- install the weather radar transceivers 1 and 2 (1SQ1 and 1SQ2)

(Ref. 34-41-33, P. Block 401) if removed.
(5)Close the access door 121BL.
(6)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(7)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Cleaning of Relay Box Grids

A. Equipment and Materials

A.	Access Platform 2.6 m (8 ft 6 in.)
B.	Vacuum Cleaner
Referenced Procedure	
24-41-00, P. Block 301	AC External Power Control

B. Job Set-up
(1)Energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Put an access platform 2.6 m (8 ft 6 in.) in position at access door 811.
(3)Open access door 811.
(4)Open access doors 131AZ and 132AZ.

C. Procedure
NOTE : In avionics compartment, use a vacuum cleaner and a soft brush to clean equipment.
Keep vacuum cleaner out of the avionics compartment to prevent dust contamination.
(1)Cleaning of grids of the left relay box 106VU
(a)Clean left and right external grids.
(b)Clean bottom external grids.
(c)Open door of the relay box.
(d)Clean left and right internal grids.
(e)Clean bottom internal grids.
(f)Close door of the relay box.
(2)Cleaning of grids of the right relay box 107VU
(a)Clean left and right external grids.
(b)Clean bottom external grid.
(c)Open door of the relay box.
(d)Clean left and right internal grids.
(e)Clean bottom internal grid.
(f)Close door of the relay box.

D. Close-up
(1)Make sure that work area is clean and clear of tools and other items.
(2)Close access doors 131AZ and 132AZ.
(3)Close access door 811.
(4)Remove access platform(s).
(5)De-energize aircraft electrical network (Ref. 24-41-00, P. Block 301).

LUBRICATION

WARNING : REPEATED OR PROLONGED CONTACT OF SKIN WITH LUBRICANTS WILL CAUSE SKIN DEHYDRATION AND CAN CAUSE SEVERE DERMATITIS.
WASH HANDS THOROUGHLY WITH SOAP AND WATER BEFORE STARTING WORK.
APPLY BARRIER CREAM TO HANDS, WRISTS AND FOREARMS.
RUB CREAM UNDER FINGERNAILS AND INTO CREASES OF SKIN.

1. General

The lubrication instructions define :
- Specification of the lubricant to be used.
- Points to be lubricated.
- Special precautions to be observed.

A. Equipment and Materials

Depending on the type of lubrication, use :
- A grease gun,
- An oil can,
- A brush,
- A clean lint-free cloth,
- An aerosol spray.

B. Lubricant Specifications

R (1)The lubricant and grease references quoted in the figures which follow
R are those given in the Table of Materials in 20-31-00 (P. BLock 1).
R (2)Airbus recommendations related to the mixing of greases
R (a)Do not mix greases that have different specifications.
R NOTE : Refer to SIL12-008 for more information on mixing of greases.
R (b)After selection of a grease specification, always use a grease
R that has the same specification.
R (c)If it was necessary to mix greases that have different
R specifications (specially greases with clay thickeners and
R greases with lithium thickeners), decrease the MPD service
R intervals by half for approximately 3 or 4 services.
R NOTE : This will give a better purge in the related mechanism.
R (d)For a satisfactory purge in the mechanism, continue to put the
R new grease into the grease fitting while the old grease comes
R out. Stop when you see only the new grease come out.

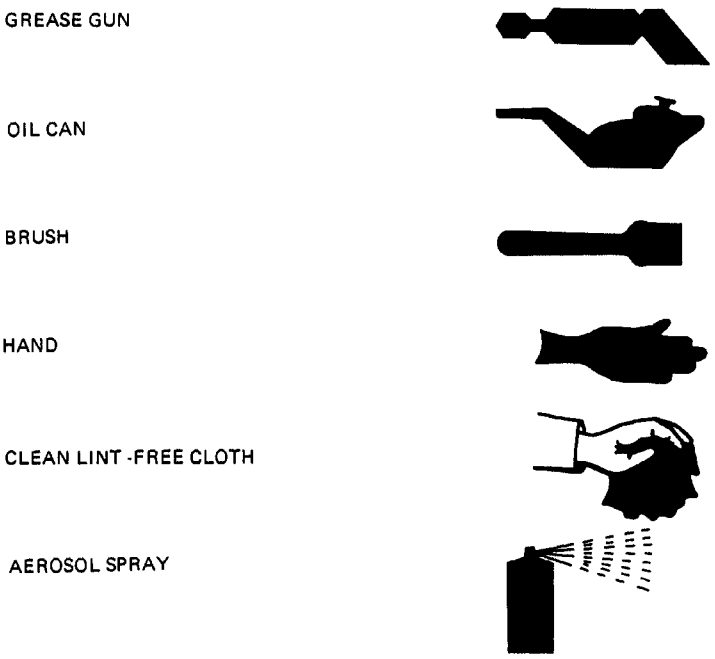
C. General Requirements

(1)Use only scrupulously clean lubricants and tools for lubrication operations.
(2)Before starting any lubricating operation, carefully clean the grease nipples and lubricating holes.
Lubrication must be accomplished immediately.
R Make sure that the grease nipples have balls and springs.
(3)Apply all lubricants slowly and smoothly.
R Make certain that the old grease comes out of the pressure relief
R valves and on each side of the spherical bearings (unless the quantity of grease to be used is indicated).
NOTE : This removes contamination along with used grease.

(4)After lubrication, remove all surplus grease. Wipe the grease nipple with a clean, lint-free cloth.
Check that the ball bearing is seated.

(5)Before lubrication, the wheel bearings should be cleaned with material 11-002, (Cleaning Agent, Ref. 20-31-00).
The bearings should be lubricated and installed immediately.

D. Lubrication Symbols (Ref. Fig. 001)
The symbols used represent the recommended lubrication method.
Below each symbol, an index indicates :
- First term : the lubrication point location.
- Second Term : the lubricant to be used (reference quoted in 20-31-00, Table of Materials).



BM5 12 22 00 0 AAM0 – 00

Lubrication Symbols
Figure 001

1. General
The following procedures detail lubrication of components in the flight control system.

2. Equipment and Materials

ITEM	DESIGNATION
A. 98A79003000000	Grease Gun Assembly
R or equivalent	
B. Material No. 03-001	Oils (Ref. 20-31-00)
C. Material No. 04-004	Common Greases (Ref. 20-31-00)
D. Material No. 04-017	Common Greases (Ref. 20-31-00)
E. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
F. Material No. 04-024	Common Greases (Ref. 20-31-00)
G. Material No. 19-003	Lint-Free Cotton Cloth (Ref. 20-31-00)
H.	Container
Referenced Procedure	
- 27-41-00, P. Block 501	Mechanical Control (THS) - Adjustment Test

3. Procedure

A. Trimmable Horizontal Stabilizer
(Ref. Fig. 001)

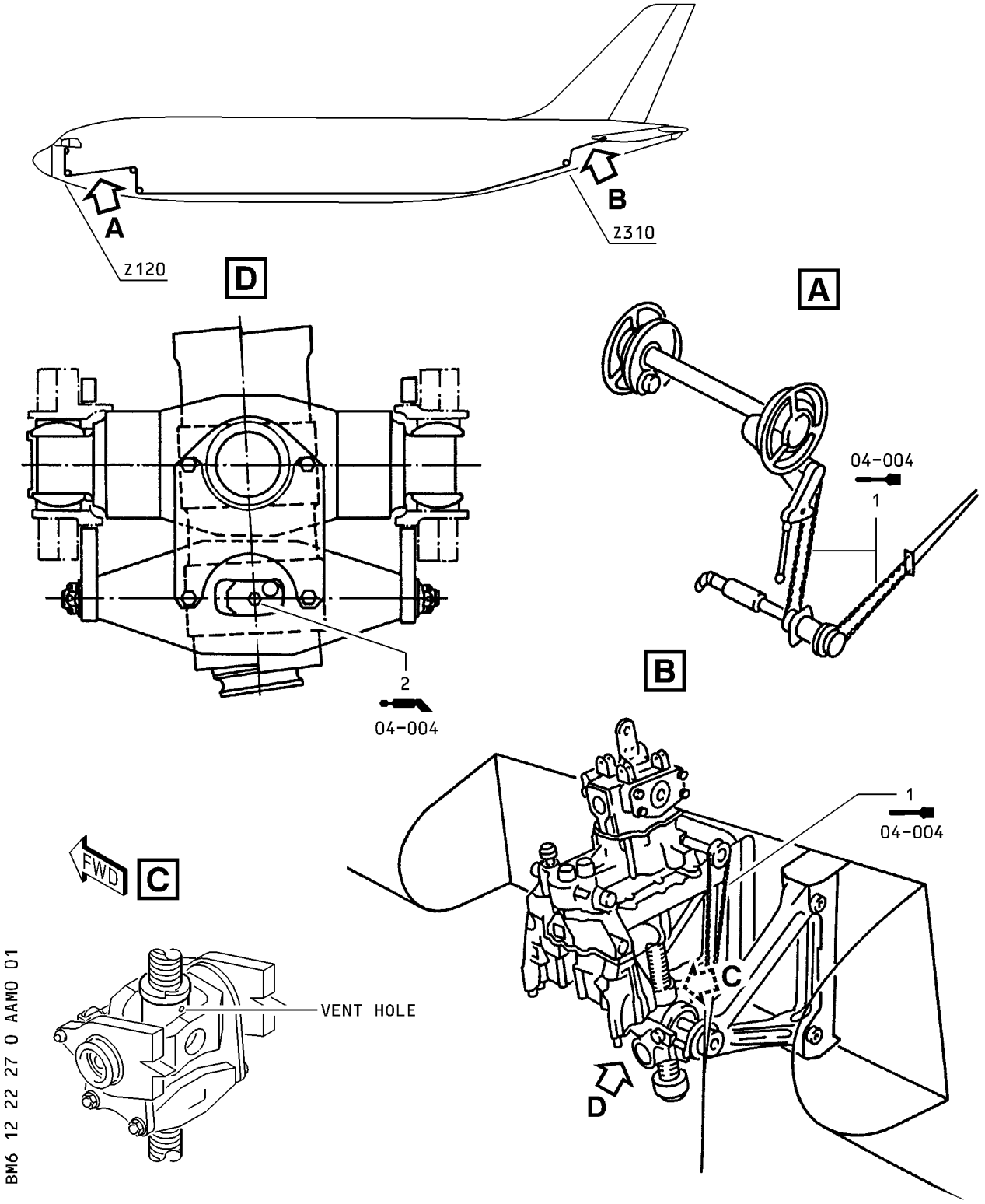
FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
1	04-004	Chain-Mechanical Control	3	
2	04-004	Ballscrew Nut-THS Actuator	1	

(1)Lubrication of the Mechanical Control Chain

CAUTION : TO PREVENT MALFUNCTION OF THE THS ACTUATOR MOVEMENT:
- MAKE SURE THAT THE CABLE IS IN PROPER POSITION AND CORRECTLY INSTALLED.
- MAKE SURE THAT THE THSA OPERATES OVER THE FULL RANGE BY USING THE ELECTRICAL TRIM (ZERO - FULL NOSE-UP - FULL NOSE-DOWN - ZERO).

(a)Verify the proper position of the cable before closing the cover assembly.
- Make sure that the cable is correctly installed.
- The cable chain assembly must run inside the U-Form of the guide blocks.

(b)Verify that the THS operates over the full range by using the electri-



THS Chains and Ball Screw Nut
Figure 001

R

cal trim (ZERO - FULL NOSE-UP - FULL NOSE-DOWN - ZERO) after the cover assembly has been closed (Ref. 27-41-00, P. Block 501).

(2)Lubrication of the THS Actuator Ball Screw Nut

CAUTION : DO NOT MIX LITHIUM-COMPLEX THICKENED GREASE WITH CLAY-THICKENED GREASE. IF YOU MIX THESE GREASES, YOU CAN CAUSE DAMAGE TO THE BALL NUT OF THE THS ACTUATOR.

(a)Make sure that the temperature of the ball screw nut is above 1 °C (33.80 °C).
(b)Clean the vent hole area, the grease nipple and the THS-actuator ball screw-nut with a clean lint-free cloth (Material No. 19-003).
(c)Use a non-metallic device and make sure that the vent hole is clear.
(d)Put a container in position below the vent hole.
(e)Use a grease gun assembly and apply the new COMMON GREASE (Material No. 04-004) through the grease nipple of the THS-actuator ball screw-nut until the new grease comes out through the nut vent hole. It is normal that some grease comes out through the upper/lower nut seal.
(f)Use a grease gun assembly and apply again the new COMMON GREASE (Material No. 04-004) through the grease nipple of the THS-actuator ball screw-nut until 150 cm^3 (9.15 $in.^3$) of the new grease comes out through the nut vent hole.
(g)Remove the unwanted grease from the grease nipple and the top and bottom of the nut with a clean lint-free cloth (Material No. 19-003).
(h)Remove the container.
(j)Operate the THS to the 14° UP stop position and then back to the neutral position (Ref. 27-41-00, P. Block 501).
(k)Clean the THS-actuator ball screw-nut with a clean lint-free cloth (Material No. 19-003).
(l)Put a container in position below the vent hole.
(m)Use a grease gun assembly and apply the new COMMON GREASE (Material) No. 04-004) through the grease nipple of the THS-actuator ball screw-nut until the new grease comes out through the nut vent hole continuously.
(n)Use a grease gun assembly and apply again the new COMMON GREASE (Material No. 04-004) through the grease nipple of the THS-actuator ball screw-nut until 150cm^3 (9.15 $in.^3$) of the new grease comes out through the nut vent hole.
(p)Clean the vent hole area, the grease nipple and the THS-actuator ball screw-nut with a clean lint-free cloth (Material No. 19-003).
(q)Make sure that the ball in the grease nipple has closed correctly after lubrication.
(r)Remove the container.

B. Flaps

CAUTION : TO PREVENT DAMAGE OR DISPLACEMENT OF THE SCREWJACK BALL SCREW NUT SEALS, USE A HANDPUMP GREASE GUN TO GREASE THE BALL SCREW NUTS. IF A HANDPUMP IS NOT AVAILABLE, USE GREASING EQUIPMENT WITH A PRESSURE OF NOT MORE THAN 3 bar (43.5 psi).

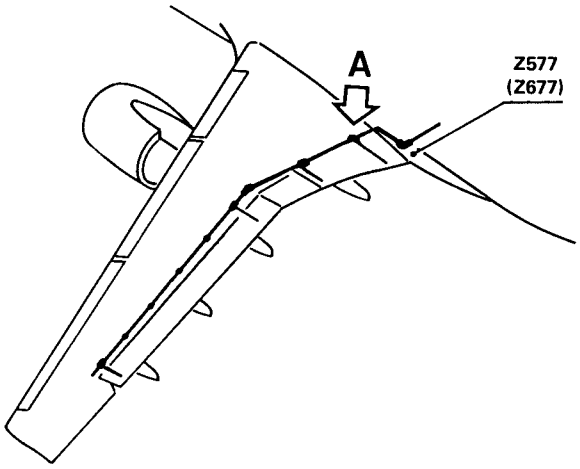
CAUTION : DO NOT MIX THE LITHIUM SOAP THICKENED GREASE (04-024) WITH GREASE QUALIFIED TO MIL-G-23827 (04-004), MIL-PRF-23827 (04-004), MIL-G-81322 (04-004A) AND MIL-PRF-(04-022) OR ANY OTHER GIVEN SPECIFICATIONS.

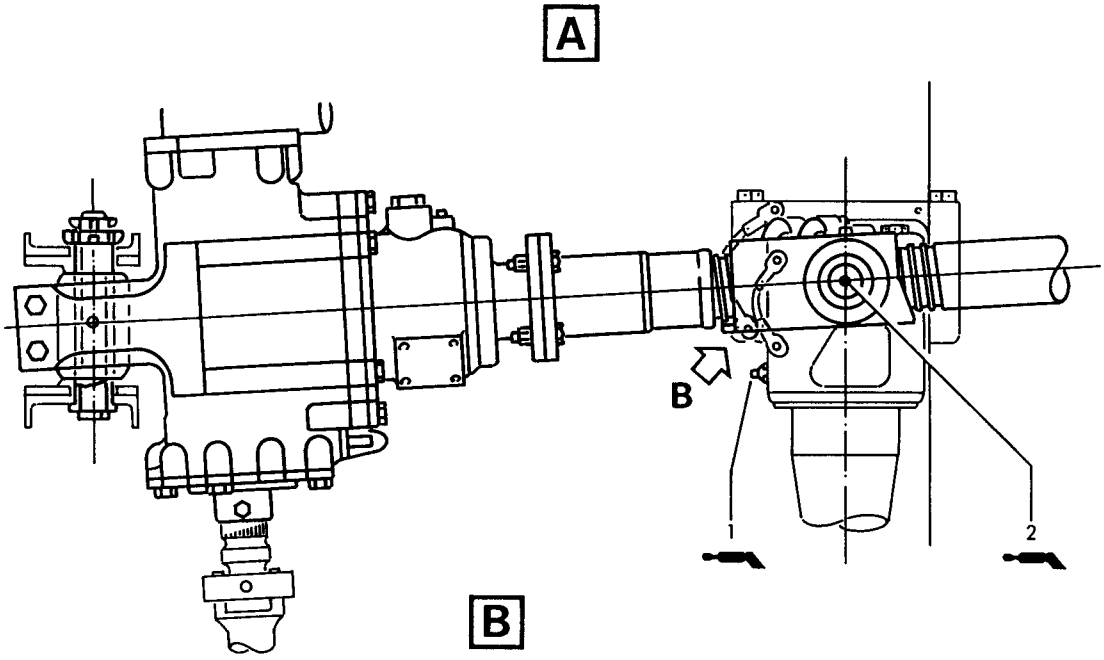
(Ref. Fig. 002)

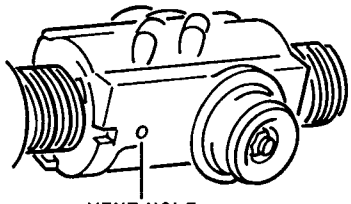
FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
1	04-004 or 04-024	Screwjack 1 - Trunnion Bearings	2	
2	04-004 or 04-024	Screwjack 1 - Ball Screw Nuts	2	Lubricate only one of the two grease nipples on each ball screw nut NOTE : Lubricate the ball screw nuts through the nipple with grease, until clean grease emerges from the vent hole. Remove ejected grease.

(Ref. Fig. 003)

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
		Screwjacks 2 thru 4	46	7 at screwjack 3 and 4 9 at screwjacks 2
3	04-004 or 04-024	- Universal Joints		
4	04-004 or 04-024	- Ball Screw Nuts		NOTE : Lubricate the ball screw nuts through the nipple with grease, until clean grease emerges from the venthole. Remove ejected grease.
5	04-004 or 04-024	- Trunnion Bearings		
6	04-004 or 04-024	- Secondary Load Path Thrust Bearings		Srewjack 2 only







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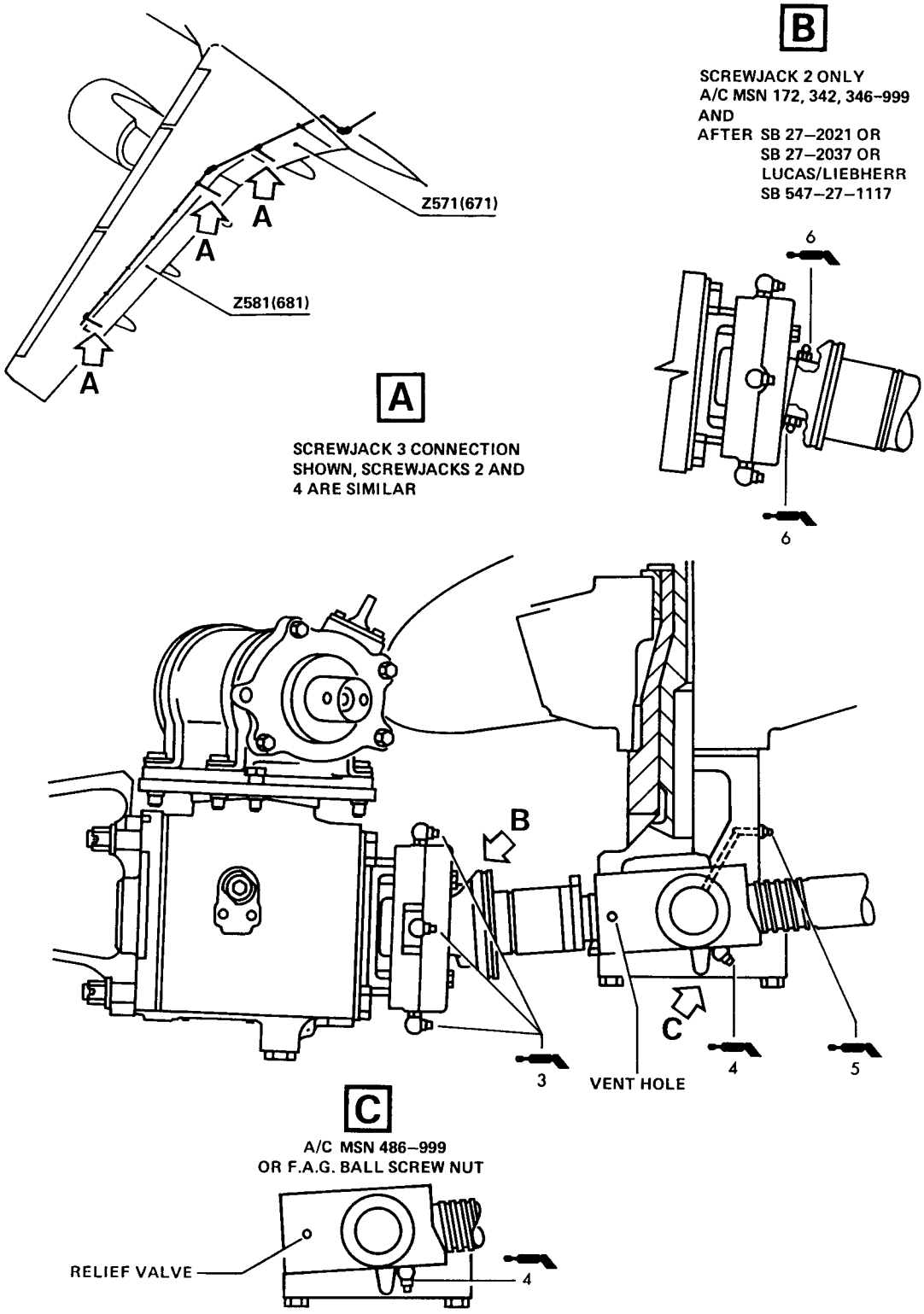
Flap Screwjack 1
Figure 002



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Flap Screwjacks 2 thru 4
Figure 003

(Ref. Fig. 004)

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
7	04-004 or 04-024	Vane Track Rollers	40	4 each vane track
8	11-002 04-004 or 04-024)	Vane Tracks	10	After cleaning, lightly smear tracks with grease (Material No. 04-004 or 04-024)

(Ref. Fig. 005)

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
9	04-004 or 04-024	Flap Track 1 - Carriage Roller Bearing	4	2 each flap track
10	04-004 or 04-024	Flap Track 1 - Guide Roller Bearings	2	1 each flap track

(Ref. Fig. 006)

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
11	04-004 or 04-024	Carriages 2 thru 5, Forward Roller Bearings	16	2 each carriage
12	04-004 or 04-024	Carriages 2 thru 5, Aft Roller Bearings	16	2 each flap track

(Ref. Fig. 007)

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
13	04-004 or 04-024	Flap Track Beams 2 thru 5, Aft "Floating" Attachment	24	3 each track

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
14	11-002 04-004 or 04-024)	Flap Track Channels 2 thru 5	8	After cleaning, lightly smear with grease (Material No. 04-004 or 04-024)

(Ref. Fig. 008)

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
15	03-001 11-002	Flap Vane Buffer	4	

C. Slats

CAUTION : TO PREVENT DAMAGE OR DISPLACEMENT OF THE SCREWJACK BALL SCREW NUT SEALS, USE A HANDPUMP GREASE GUN TO GREASE THE BALL SCREW NUTS. IF A HANDPUMP IS NOT AVAILABLE, USE GREASING EQUIPMENT WITH A PRESSURE OF NOT MORE THAN 3 bar (43.5 psi).

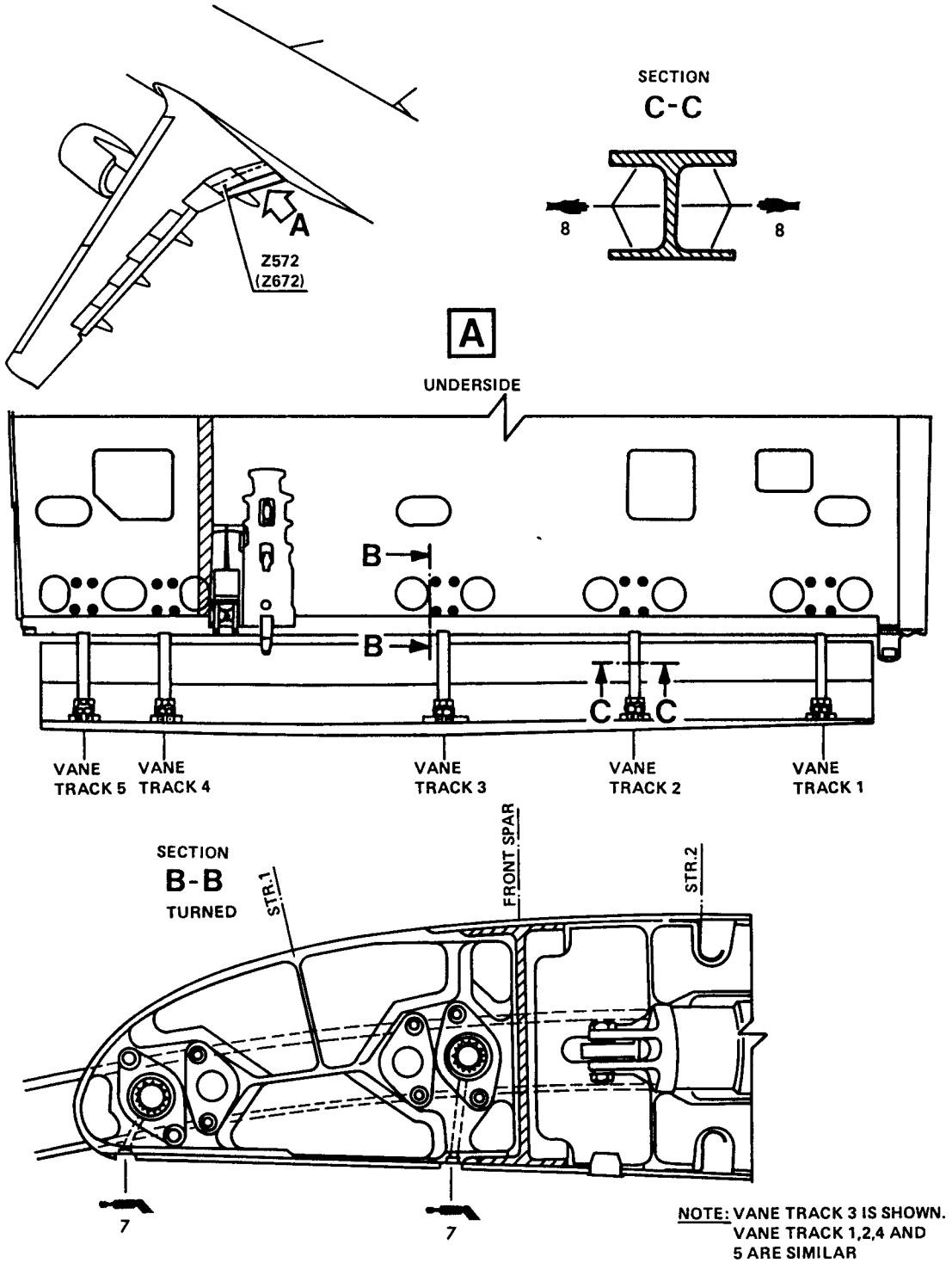
(Ref. Fig. 009)

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
1	04-004 or 04-024	Screwjacks 1 thru 6 - Ball Screw Nuts	24	2 each screwjack

(Ref. Fig. 010)

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
2	04-004 or 04-024	Slat Tracks-Attachment Bolts	16	1 each; tracks 4 thru 11

(Ref. Fig. 011)



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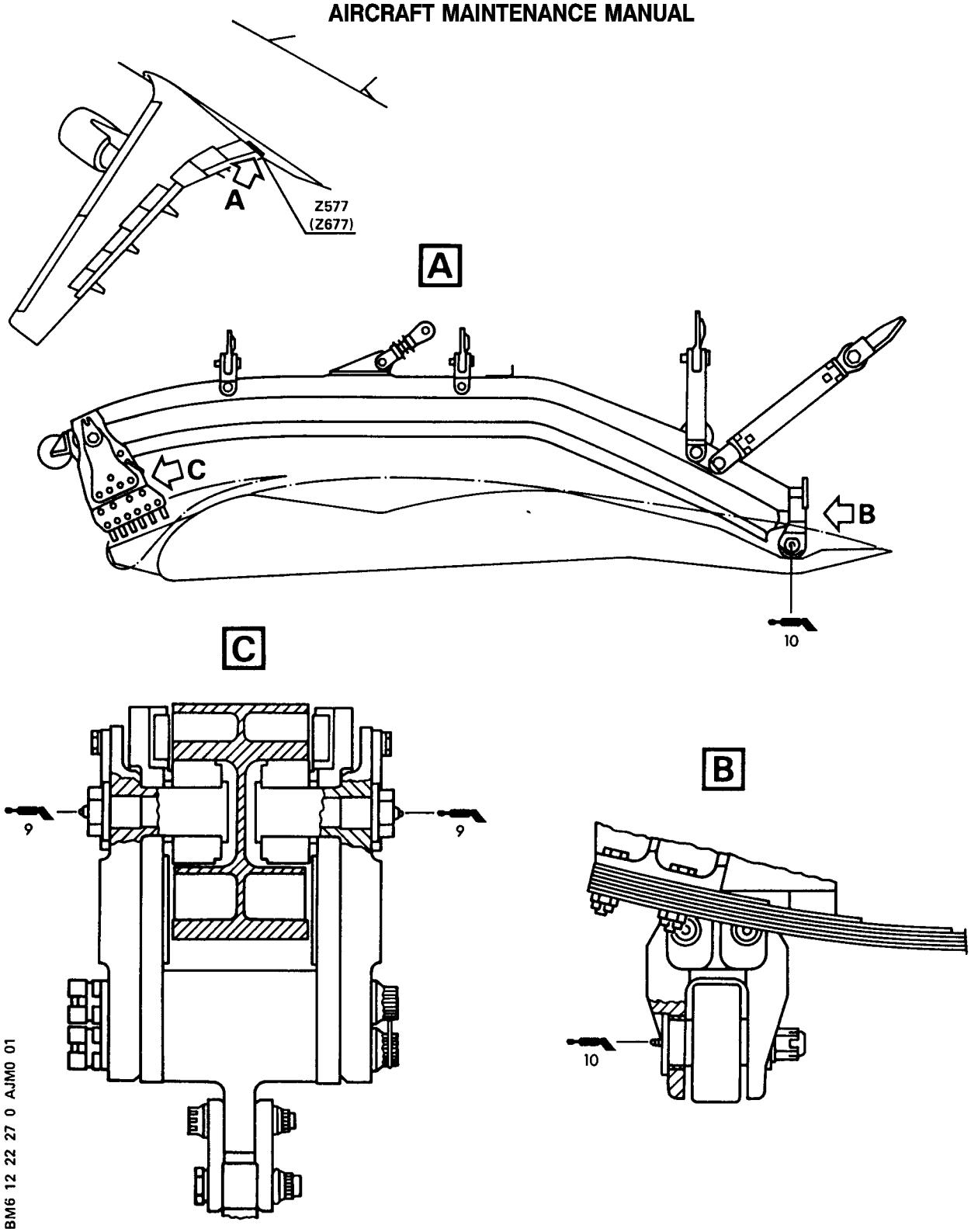
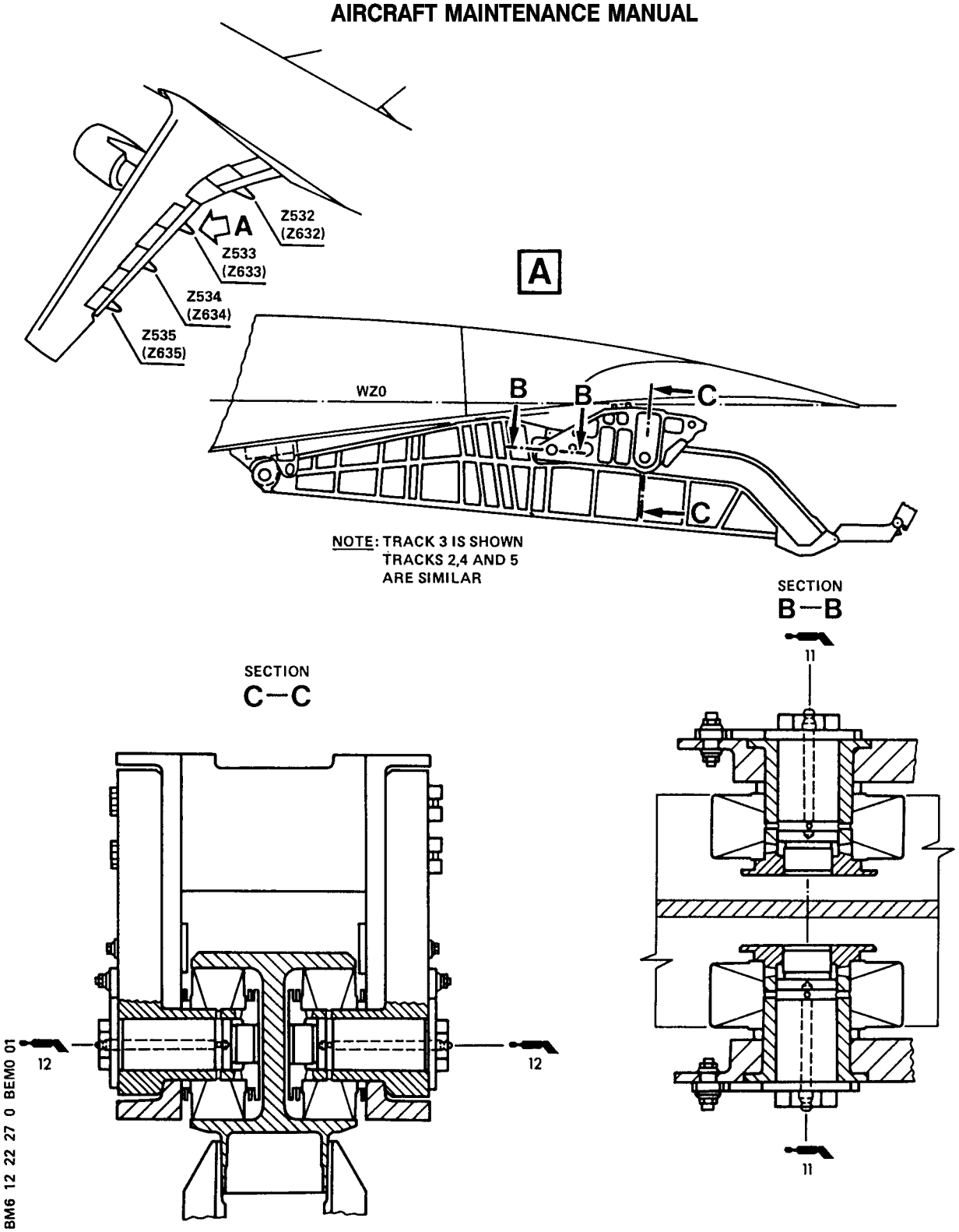
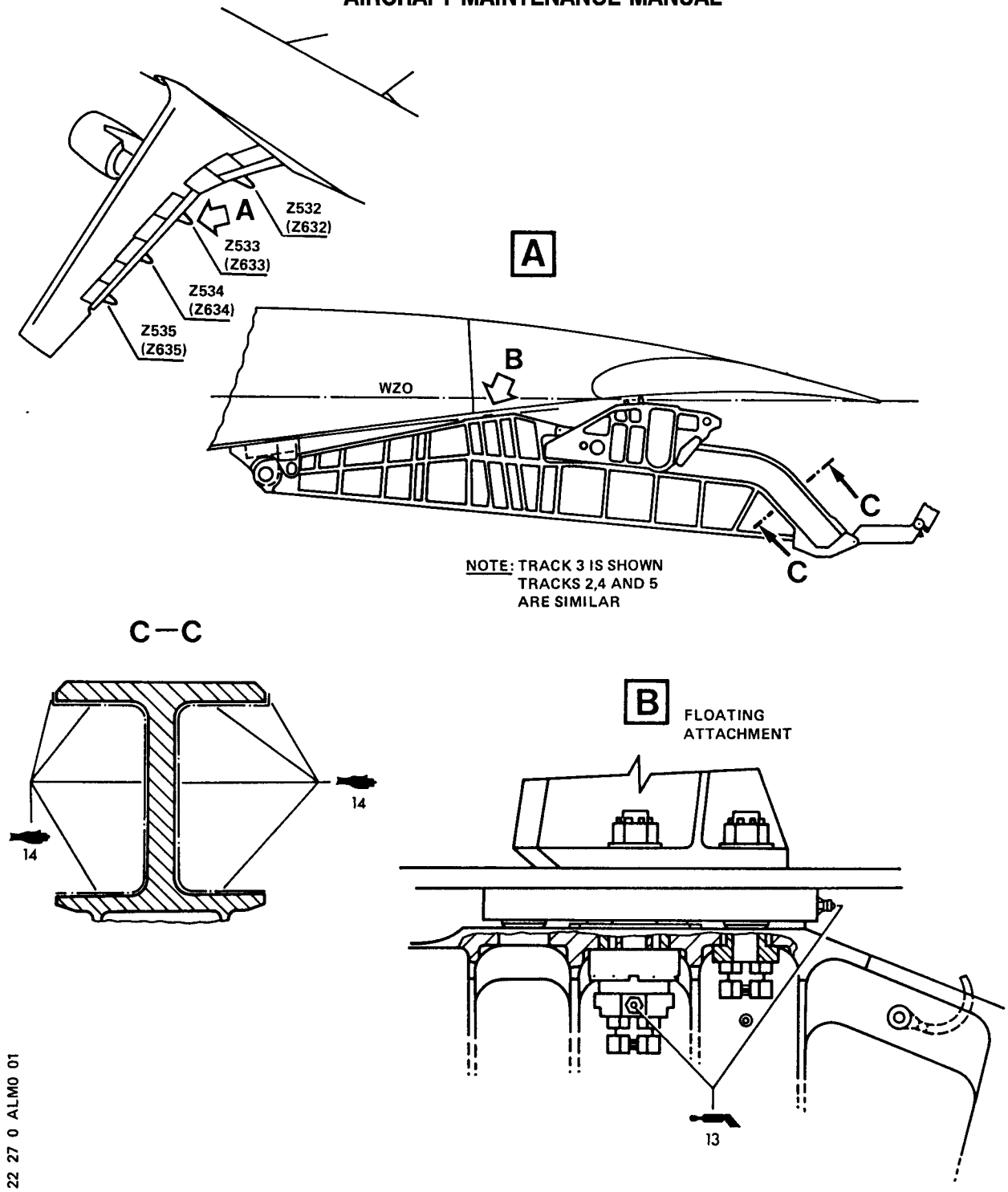
Flap Vane Tracks
Figure 004



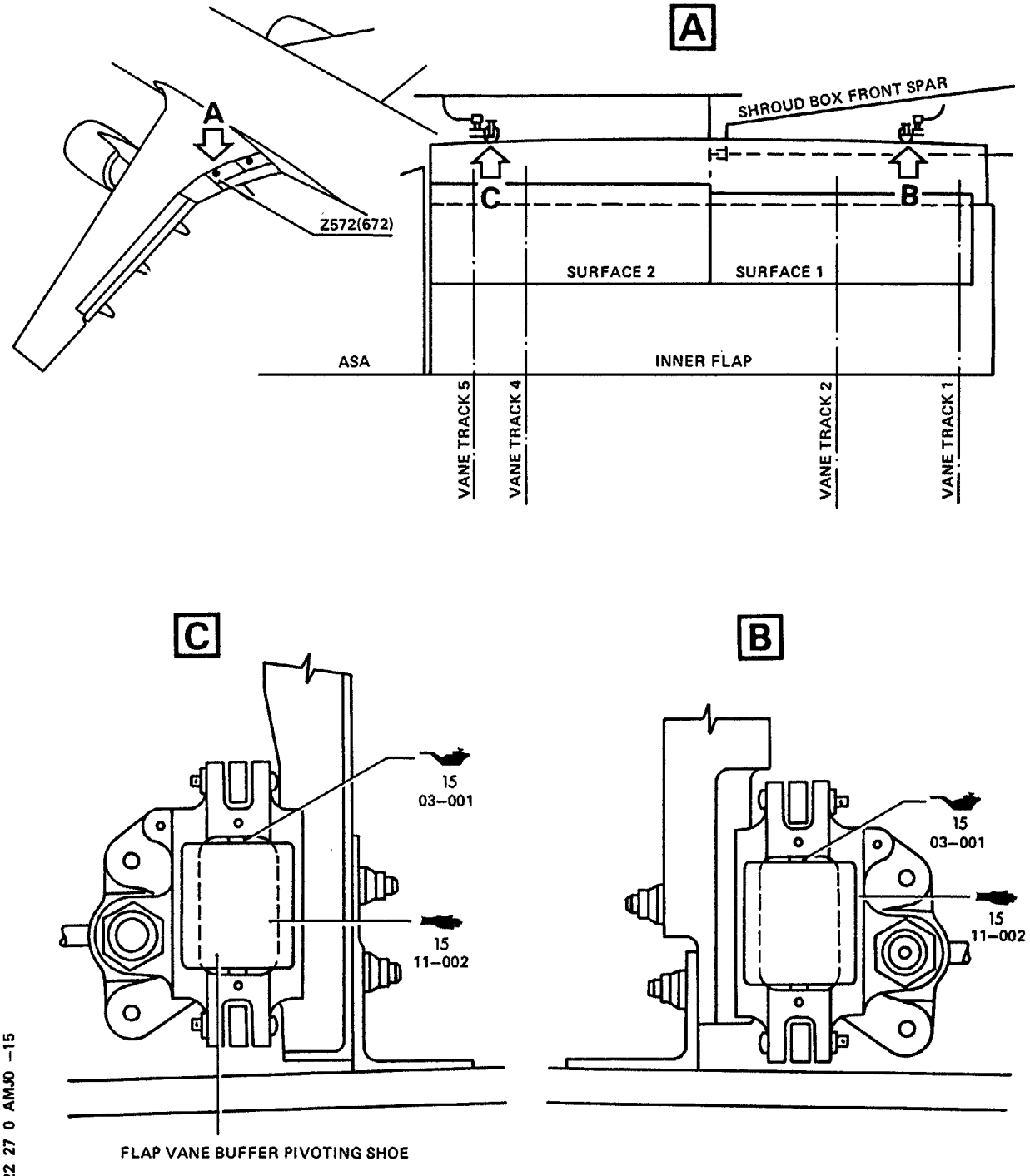
Flap Track 1
Figure 005



Flap Carriage Rollers
Figure 006



Flap Tracks 2 thru 5
Figure 007



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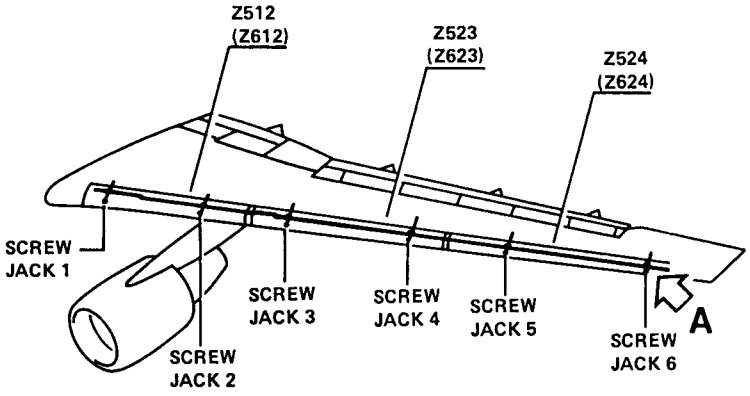
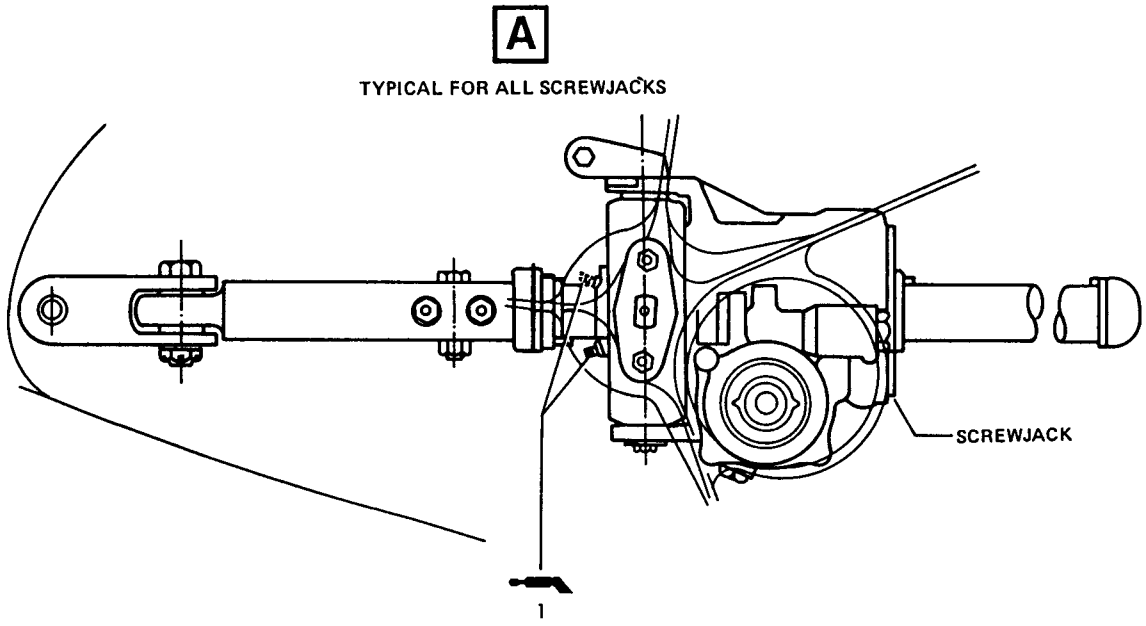
Flap Vane Buffer
Figure 008





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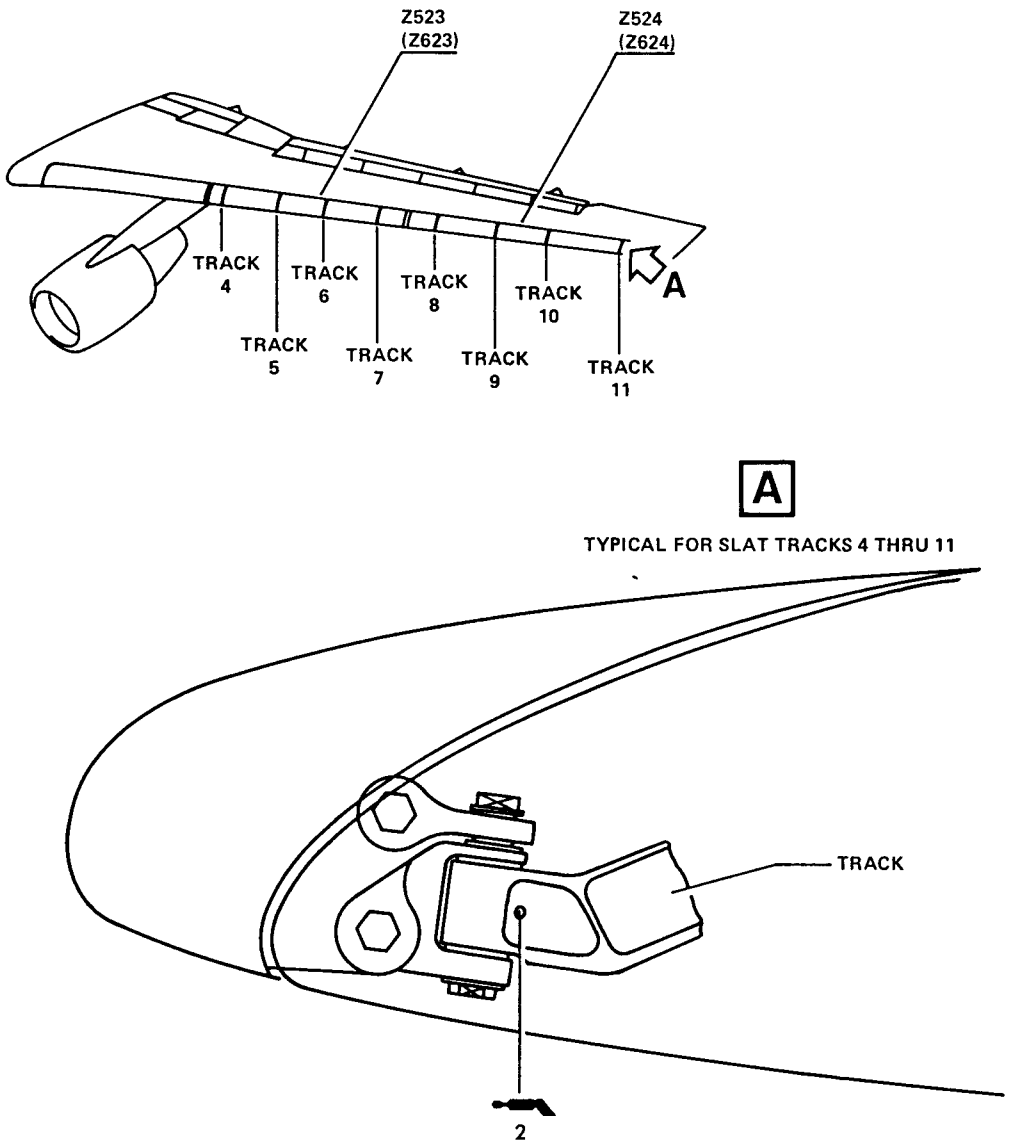
Slat Screwjacks 1 thru 6
Figure 009



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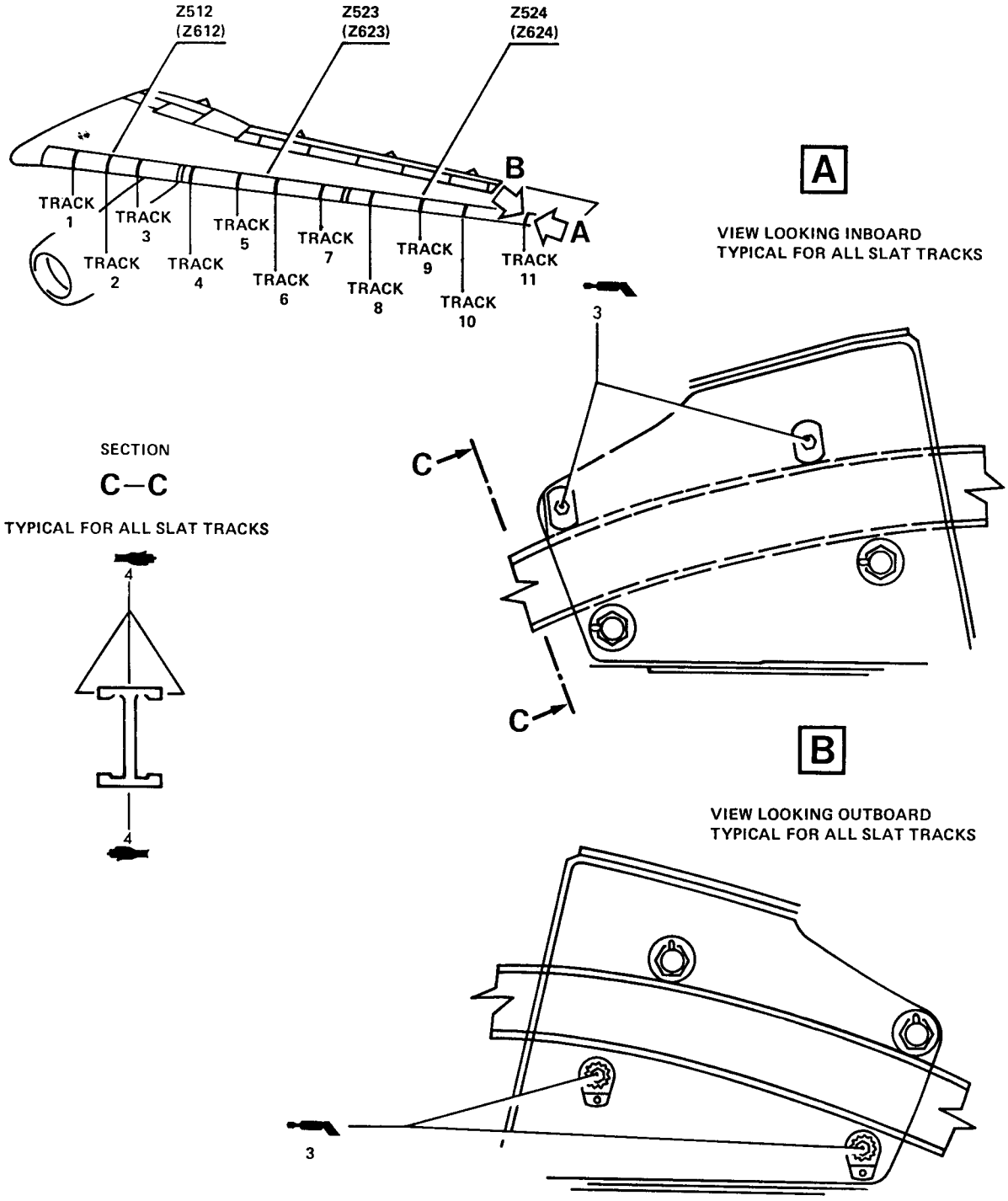
Slat Track Attachment Bolts
Figure 010



Slat Track Rollers
Figure 011

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
3	04-004 or 04-024	Slat Tracks-Roller Bearings	88	4 each track
4	11-002 04-004 or 04-024)	Slat Track Side Pads	22	After cleaning, lightly smear tracks with grease (Material No. 04-004 or 04-024)

(Ref. Fig. 012)

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
5	04-017	Slat Track Shutter Guides	88	4 each slat track
6	04-017	Slat Track Shutter Springs	44	2 each slat track
7	04-017	Slat Track Shutter Rollers	88	4 each slat track
7	04-017	Screwjack 6 Shutter Rollers and Guides	16	4 guide tracks 4 rollers

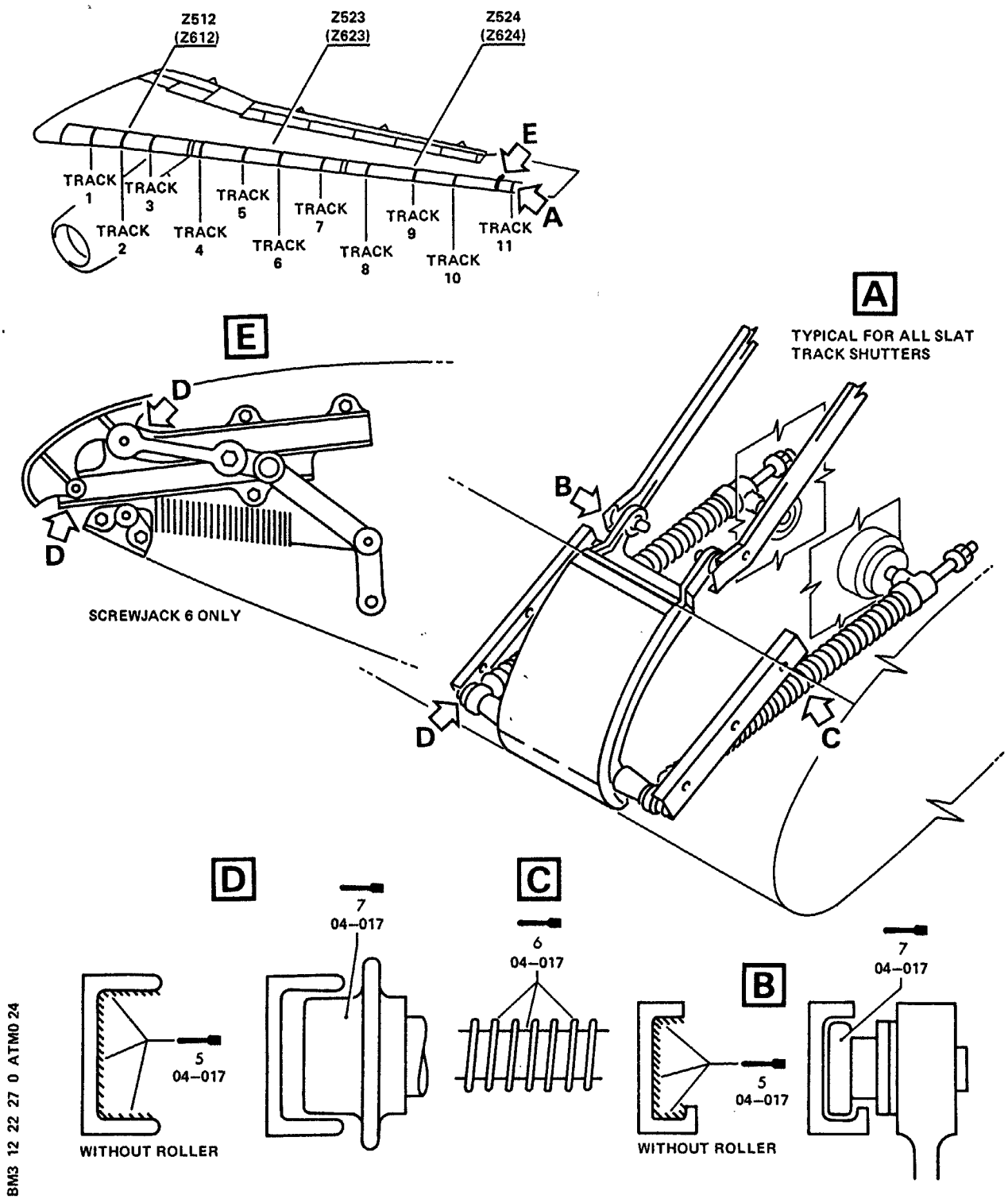
D. Ailerons and Spoiler/Speedbrakes
(Ref. Fig. 013)

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
1	04-004	Aileron Hinge Bearings	12	

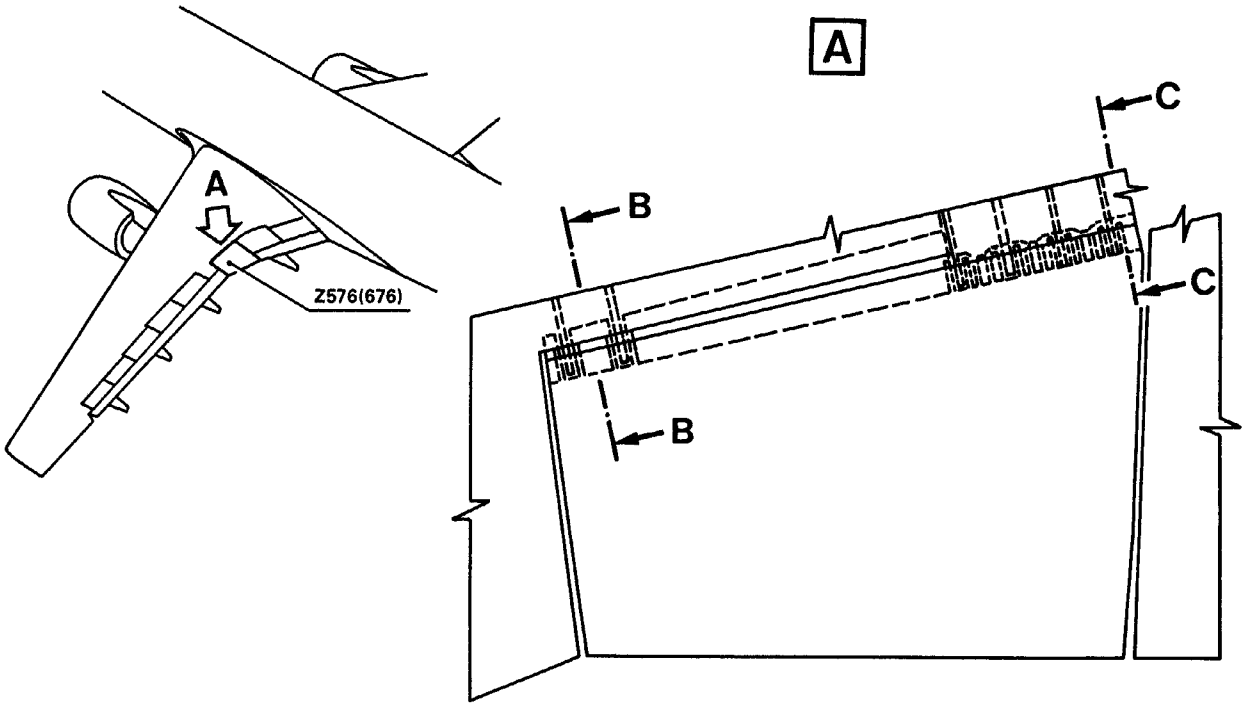
(Ref. Fig. 014)

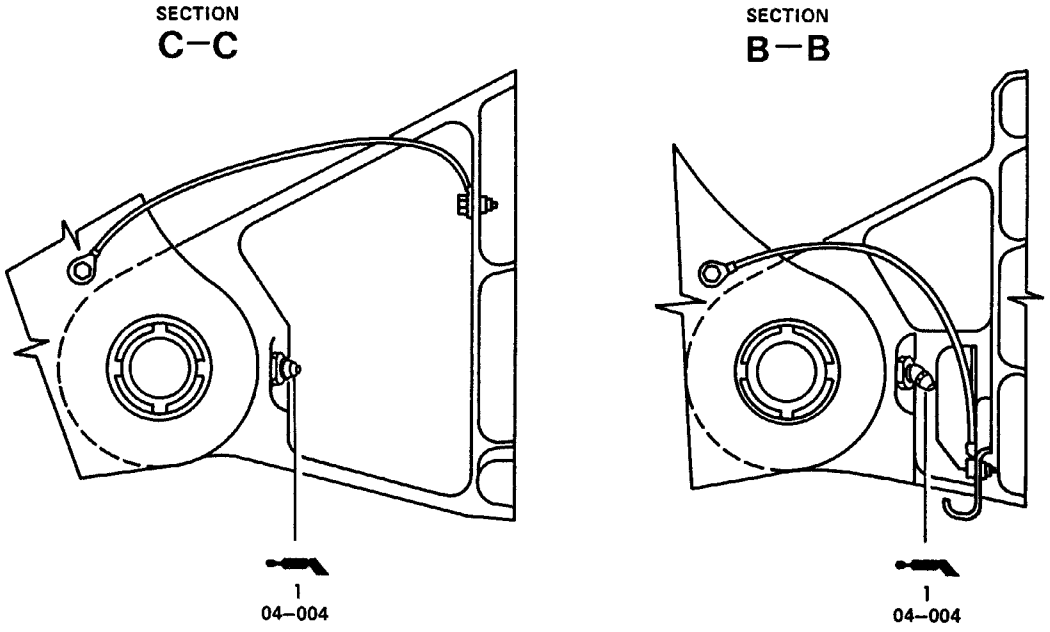
FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
2	04-004	Chains-Trim Screwjack	2	
3	04-004	Chains-Trim Actuator	2	

(Ref. Fig. 015)



Slat Track and Screwjack 6 Shutters
Figure 012





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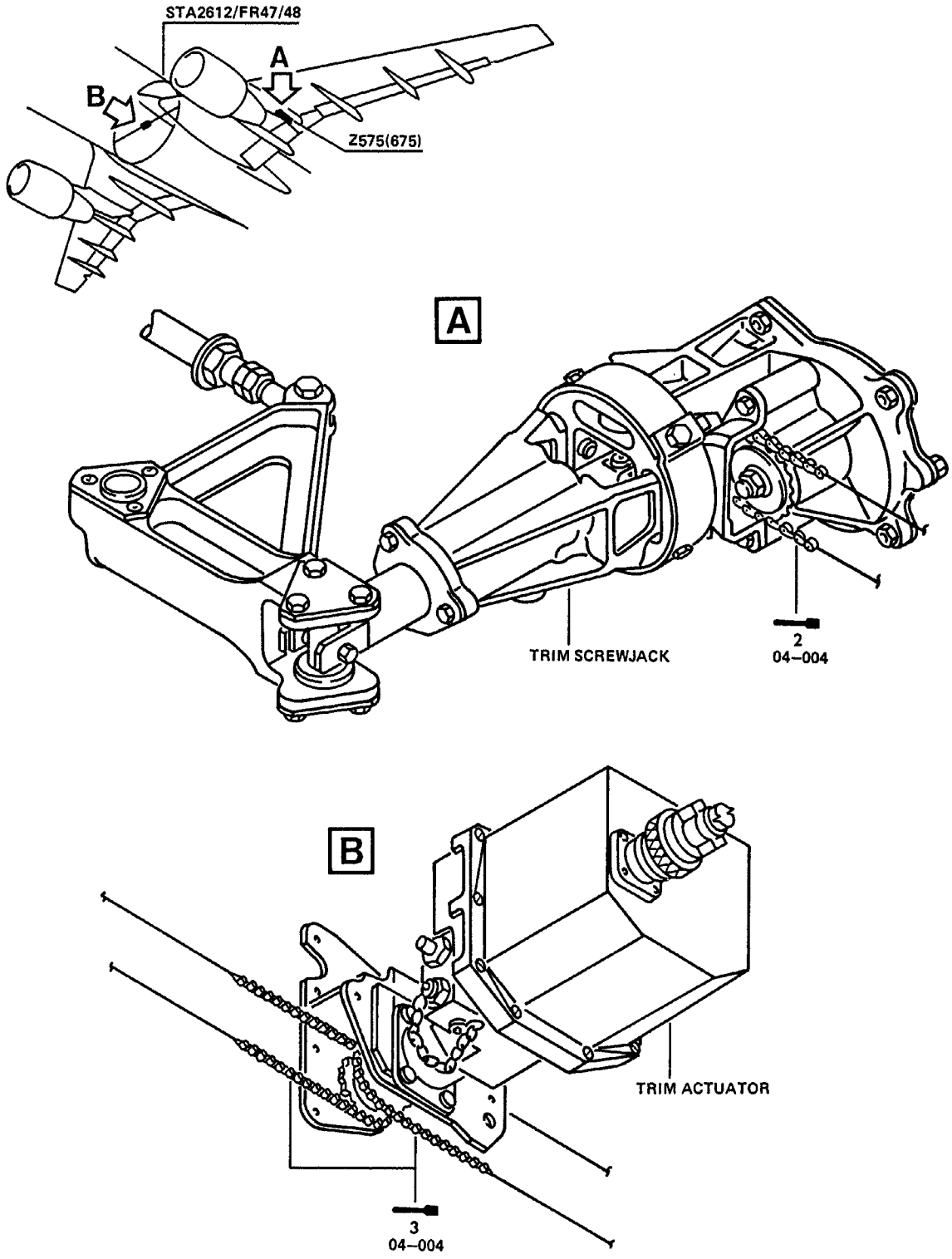
Aileron Hinges
Figure 013



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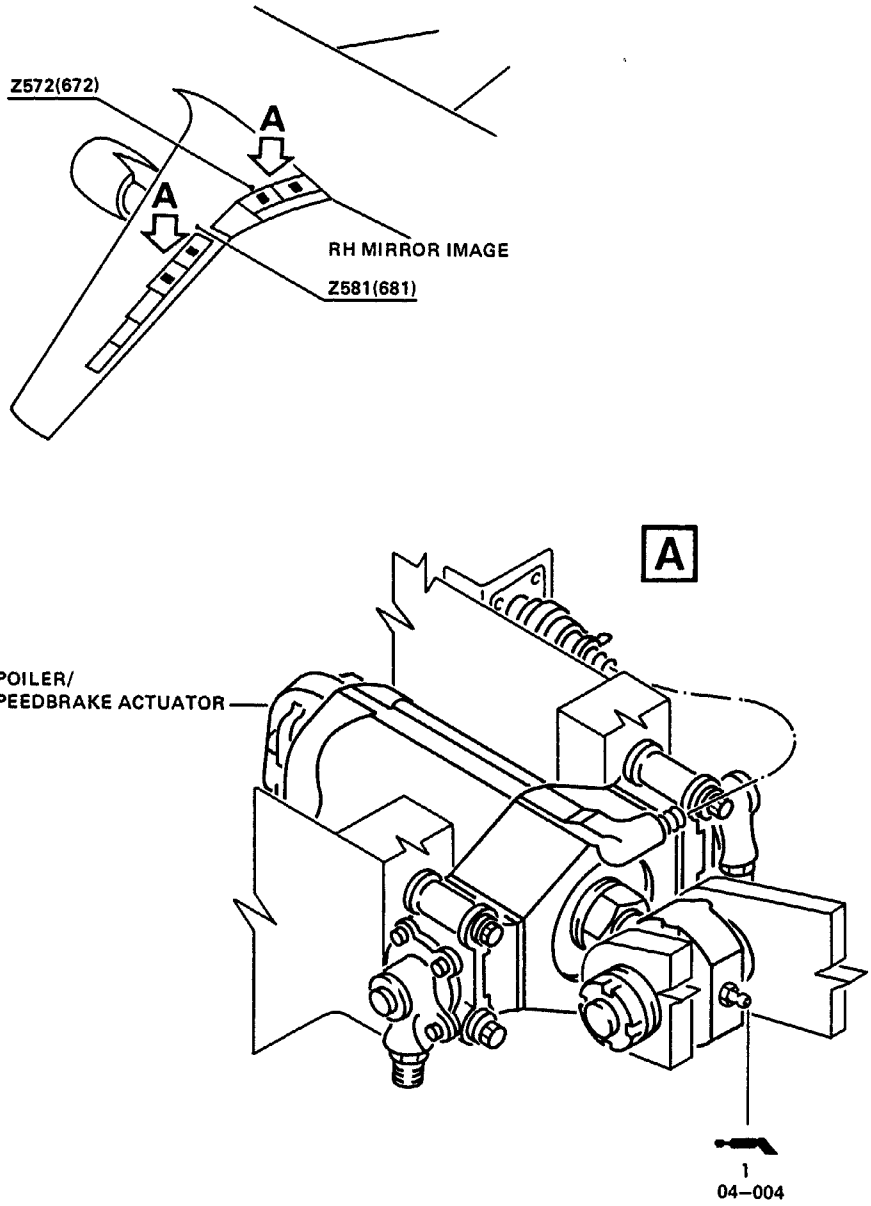
Aileron Trim Chains
Figure 014



NOTE: TYPICAL FOR SURFACES 1–4

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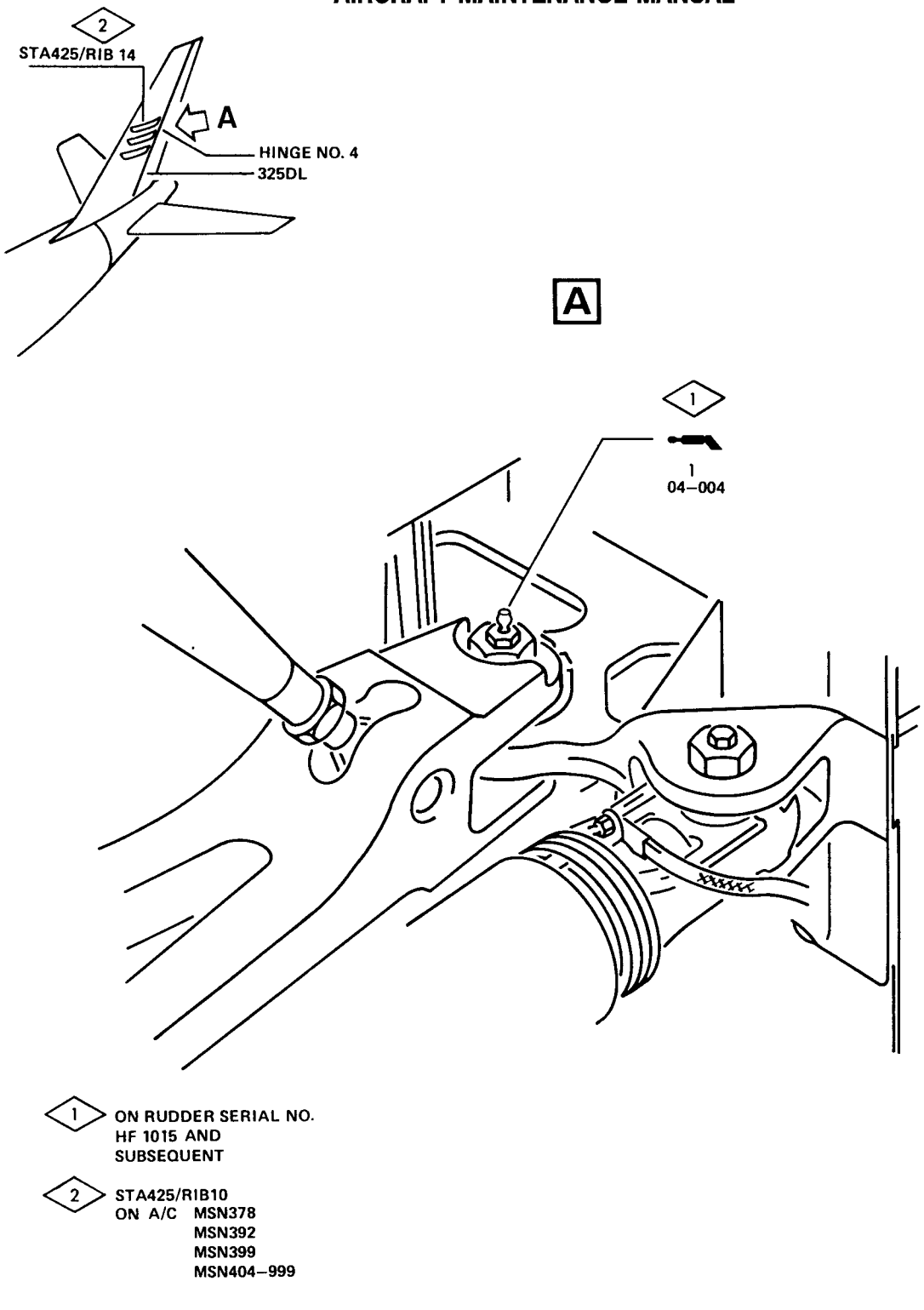
Spoiler/Speedbrakes Actuator 1 thru 4
Figure 015

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
1	04-004	Actuator Attachment Bearings 1 thru 4	8	1 each actuator

E. Rudder
(Ref. Fig. 016)

FIG REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
1	04-004	Rudder Hinge-Bearing No. 4	1	



1 ON RUDDER SERIAL NO. HF 1015 AND SUBSEQUENT

2 STA425/RIB10 ON A/C MSN378 MSN392 MSN399 MSN404–999

BM6 12 22 27 0 BAM0 01

Rudder Hinge No. 4
Figure 016

1. Lubrication

A. Lubrication of Rat Door Hinges

2. Equipement and Materials

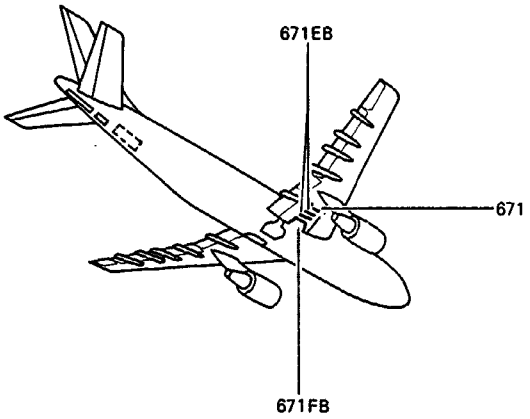
ITEM	DESIGNATION
R A. Material No. 15-004	Special Materials (Ref. 20-31-00)
Referenced Procedure - 29-25-00, P. Block 301	Ram Air Turbine

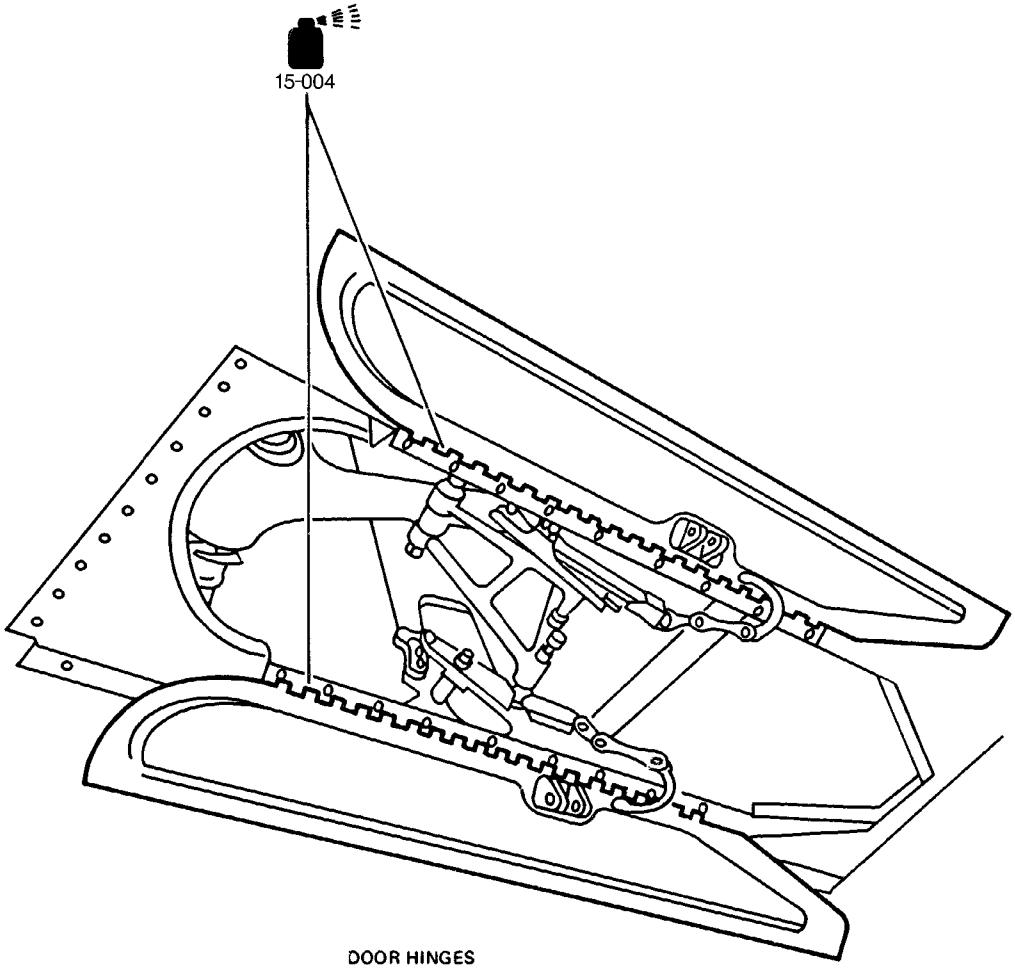
3. Procedure (Ref. Fig. 001)

A. Extend RAT (Ref. 29-25-00, P. Block 301)

R B. With RAT in extended position, spray Material No. 15-004 over RAT door hinges.

C. Retract RAT (Ref. 29-25-00, P. Block 301)





DOOR HINGES

BM5 12 22 29 0 AAM0 11

RAT Door Hinge Lubrication
Figure 001

1. Landing Gear - Lubrication

A. Equipment and Materials

ITEM	DESIGNATION
(1)98A79003000000 or equivalent	Grease Gun Assembly
(2)Material No. 04-004	Common Greases (Ref. 20-31-00)
(3)Material No. 04-022	Common Greases (Ref. 20-31-00)
(4)Material No. 04-001	Common Greases (Ref. 20-31-00)
(5)Material No. 04-035	Common Greases (Ref. 20-31-00)
R Referenced Procedures	
R - 32-11-13, P. Block 401	Main Gear Shock Absorber

B. Procedure

(1)Special precautions

(a)After every operation such as : cleaning, disassembly or replacement of any lubricated component, a lubrication procedure shall be systematically carried out.

(b)Cleaning of any hinge mechanism provided with a grease nipple shall be carried out with white spirit. Lubrication of such component shall be performed after cleaning.

(2)Lubrication

(a)Prior to any lubrication procedure, thoroughly clean and check condition of grease nipples (presence of ball and spring).

R (b)Manual grease pump is recommended.

R (c)Clean and dry grease gun prior to refilling.

R (d)Operate grease gun to clean adapter which could be contaminated.

R (e)Force grease into grease nipple until old grease is eliminated.

R (f)Wipe off surplus grease to prevent dirt build-up.

R (g)Whenever possible, operate mobile parts to ensure efficient lubrication.

NOTE : If, during lubrication procedure, a strong resistance to injection of grease is experienced, grease nipple, grease insert and hinge shall be checked. If grease nipple is not jammed (seized blanking ball) and if grease insert is not clogged (hard grease build-up) disassemble hinge for further inspection to determine why lubrication is impossible.

R NOTE : During lubrication procedure, operator must notice new grease coming out from the three witness holes. If this does not occur, then old grease can be suspected to prevent the correct lubrication. At soonest convenient opportunity, it is then recommended to remove the shock absorber sliding tube (Ref. 32-11-13, P. Block 401) and remove and clean the lower bearing.

R NOTE : If operator decides to change grease type (from No. 04-004 to 04-022 or vice-versa), shock absorber sliding tube must be removed (Ref. 32-11-13, P. Block 401) and lower bearing must

R be fully cleaned before applying the new grease type.

(3)Lubrication points

NOTE : Only on landing gear and accessoiries (not on doors), grease points are identified, by a red washer installed at the base of grease nipples, or, for grease nipples incorporated in torque link hinge pins, by a red painted mark at end of pin. Lubrication points are located and listed on identification tables and identified on figures.

(a)Nose Gear (Ref. Fig. 001)

FIG REF	MATERIAL No.	LUBRICATION POINT DESIGNATION	QTY	REMARKS
1	04-004 or 04-022	Uplock assembly - nose gear NOTE : Only 2 shots of a greasing hand pump are necessary.	2	On uplock box
2	04-004 or 04-022	Attach point - actuating cylinder/structure	1	on actuating cylinder rod
3	04-004 or 04-022	Attach point - telescopic drag strut/structure	5	2 on telescopic drag strut 3 on end of pin
3a	04-004 or 04-022	Attach point - telescopic drag strut/structure	2	On structure 1 per bearing
4	04-004 or 04-022	Attach point - shock strut/ structure	6	2 on pins (L, R) 4 on shock strut (L, R)
4a	04-004 or 04-022	Attach point - shock strut/ structure	2	On structure 1 L, 1 R
5	04-004 or 04-022	Attach point - shock strut/ secondary door	2	On end of shouldered pin (L, R)
6	04-004 or 04-022	Attach point - actuating cylinder/shock strut	2	1 on spherical bearing 1 on pin
7	04-004 or 04-022	Attach point - telescopic strut/shock strut	4	1 on spherical bearing 2 on drag strut 1 on pin
8	04-004 or 04-022	Eccentric pins - rack/pinion	4	1 on each end of each pin, if necessary remove the shield/ cover for access
9	04-004 or 04-022	Bearing - shock strut/rota- ting tube NOTE : Only 5 shots of a greasing hand pump are necessary.	4	1 at front 1 below steering pulley Lubricate with wheels centered 2 rack teeth
10	04-004	Lower bearing - rotating	2	Lubrication of sliding

FIG REF	MATERIAL No.	LUBRICATION POINT DESIGNATION	QTY	REMARKS
	or 04-022	tube		tube
11	04-001 or 04-022 or 04-035	Bearings - wheel and axle		Lubricate by hand prior to installation
12	04-004 or 04-022	Attach point - lower torque link/shock absorber	4	2 on pin 2 on torque link
13	04-004 or 04-022	Center hinge pin - torque link	2	On each end of pin
14	04-004 or 04-022	Attach point - upper torque link/shock strut	4	2 on pin 2 on torque link
15	04-004 or 04-022	Attach point - torque link/ proximity sensor support	2	On each end of pin
16	04-004 or 04-022	Uplock roller assembly	1	1 on pin

(b)Nose Gear doors
(Ref. Fig. 002)

**ON A/C 105-200,

Post SB 32-2095 For A/C 105-200,

(Ref. Fig. 003)

**ON A/C ALL

FIG REF	MATERIAL No.	LUBRICATION POINT DESIGNATION	QTY	REMARKS
1	04-004 or 04-022	Attach point - door actuating cylinder/structure	4	2 L 2 R
2	04-004 or 04-022	Uplock assembly - nose gear door NOTE : Only 2 shots of a greasing hand pump are necessary.	4	2 L 2 R

FIG REF	MATERIAL No.	LUBRICATION POINT DESIGNATION	QTY	REMARKS
3	04-004 or 04-022	Attach point - door actuating cylinder/door	2	1 L 1 R
4	04-004 or 04-022	Attach point - rotating control rod/secondary door	8	3 L on attach point 3 R on attach point 1 L on rotating rod 1 R on rotating rod

**ON A/C 105-200,

Post SB 32-2095 For A/C 105-200,

FIG REF	MATERIAL No.	LUBRICATION POINT DESIGNATION	QTY	REMARKS
1	04-004 or 04-022	Attach point - door actuating cylinder/structure	4	2 L 2 R
2	04-004 or 04-022	Uplock assembly - nose gear door NOTE : Only 2 shots of a greasing hand pump are necessary.	4	2 L 2 R
3	04-004 or 04-022	Attach point - door actuating cylinder/door	2	1 L 1 R
4	04-004 or 04-022	Attach point - rotating control rod/secondary door	8	3 L on attach point 3 R on attach point 1 L on rotating rod 1 R on rotating rod
5	04-004 or 04-022	Attach point - mechanical linkage opening mechanism secondary door	2	1 L 1 R

**ON A/C ALL

(c)Main gear (Ref. Fig. 004, 005)

FIG REF	MATERIAL No.	LUBRICATION POINT DESIGNATION	QTY	REMARKS
1	04-004 or 04-022	Attach point - multiple clevis/structure	2	On clevis

FIG REF	MATERIAL No.	LUBRICATION POINT DESIGNATION	QTY	REMARKS
2	04-004 or 04-022	Attach point - cross brace/ structure	1	On cross brace
3	04-004 or 04-022	Attach point - actuating cylinder/structure	1	On actuating cylinder rod
4	04-004 or 04-022	Attach point - actuating cylinder/drag strut	1	On actuating cylinder
5	04-004 or 04-022	Attach point - shock strut/ shock absorber	2	On shock strut adjacent to cylinder door attach point
6	04-004 or 04-022	Brake to axle bearing surfaces	12	On each brake : 2 bogie beam side 1 wheel side
7	04-001 or 04-022 or 04-035	Wheel axle	4	Lubricate by hand
8	04-004 or 04-022	Lower bearing - Shock strut	3	
9	04-004 or 04-022	Uplock roller	1	
10	04-004 or 04-022	Attach point - brace strut upper and lower arms	4	2 on upper arm 2 on lower arm
11	04-004 or 04-022	Attach point - brace strut/ brace strut actuating cylinder	2	1 on cylinder 1 on lock link
12	04-004 or 04-022	Attach point - cross brace/ multiple clevis/brace strut	5	1 on clevis 2 on brace strut 2 on cross brace
13	04-004 or 04-022	Attach point - hinge arm/ structure		on shock strut hinge arm
14	04-004 or 04-022	Attach point - cross brace/ lock links	3	2 On lock links 1 On end of pin
15	04-004 or 04-022	Attach point - lock links upper and lower arms	3	2 on lower arm 1 on center pin
16	04-004 or 04-022	Attach point - brace strut/ lock links	4	2 on brace strut 2 on lock links
17	04-004	Attach point - drag strut/	3	1 on drag strut

FIG REF	MATERIAL No.	LUBRICATION POINT DESIGNATION	QTY	REMARKS
	or 04-022	brace strut/shock strut		1 on brace strut 1 on shock strut
18	04-004 or 04-022	Attach point - hinge arm/ drag strut	2	1 on each side
19	04-004 or 04-022	Attach point - shock strut/ drag strut/upper torque link	4	1 on each lug of shock strut fork fitting 1 on each upper torque link lug
20	04-004 or 04-022	Attach point - lower torque links/shock absorber	4	1 on each lower torque link lug 1 on each end of hinge pin
21	04-004 or 04-022	Attach point - shock absorsorber/pitch damper	2	1 on pitch damper 1 on universal joint
22	04-004 or 04-022	Brake bars	8	1 on each end
23	04-004 or 04-022	Attach point - pitch damper/ bogie beam	4	1 on each lug of bogie beam fork fitting 1 on pitch damper rod 1 on spacer
24	04-004 or 04-022	Attach point - shock absorber/bogie beam	4	2 on bogie beam 1 on each lug of shock absorber fork fitting
25	04-004 or 04-022	Attach point - shock absorber/brake bars	4	1 on each end of the 2 hinge pins
26	04-004 or 04-022	Center hinge pin - torque link	2	
27	04-001	Wheel bearing	8	Lubricate by hand
28	04-004 or 04-022	Attach point - hinge arm/ structure	1	on Forward Bearing
29	04-004 or 04-022	Uplock assy - hook	2	on rod
30	04-004 or 04-022	Uplock assembly NOTE : Only 2 shots of a greasing hand pumps are necessary.	3	
31	04-004 or 04-022	Attach point - shock strut/ structure	1	on shock strut bearing

FIG REF	MATERIAL No.	LUBRICATION POINT DESIGNATION	QTY	REMARKS
32	04-004 or 04-022	Mechanical control - MLG downlocked mechanical indicator	Brush	Lubrication of exposed metal parts of control system

(d)Main gear doors
(Ref. Fig. 006)

FIG REF	MATERIAL No.	LUBRICATION POINT DESIGNATION	QTY	REMARKS
1	04-004 or 04-022	Uplock assy - door NOTE : only 2 shots of a greasing hand pump are necessary.	2	
2	04-004 or 04-022	Attach point - door actuating cylinder/structure	1	
3	04-004 or 04-022	Attach point - main door/ structure	2	
4	04-004 or 04-022	Attach point - door actuating cylinder/door	1	
5	04-004 or 04-022	Pin - door uplock roller	1	
6	04-004 or 04-022	Center hinge - main door/ structure	1	

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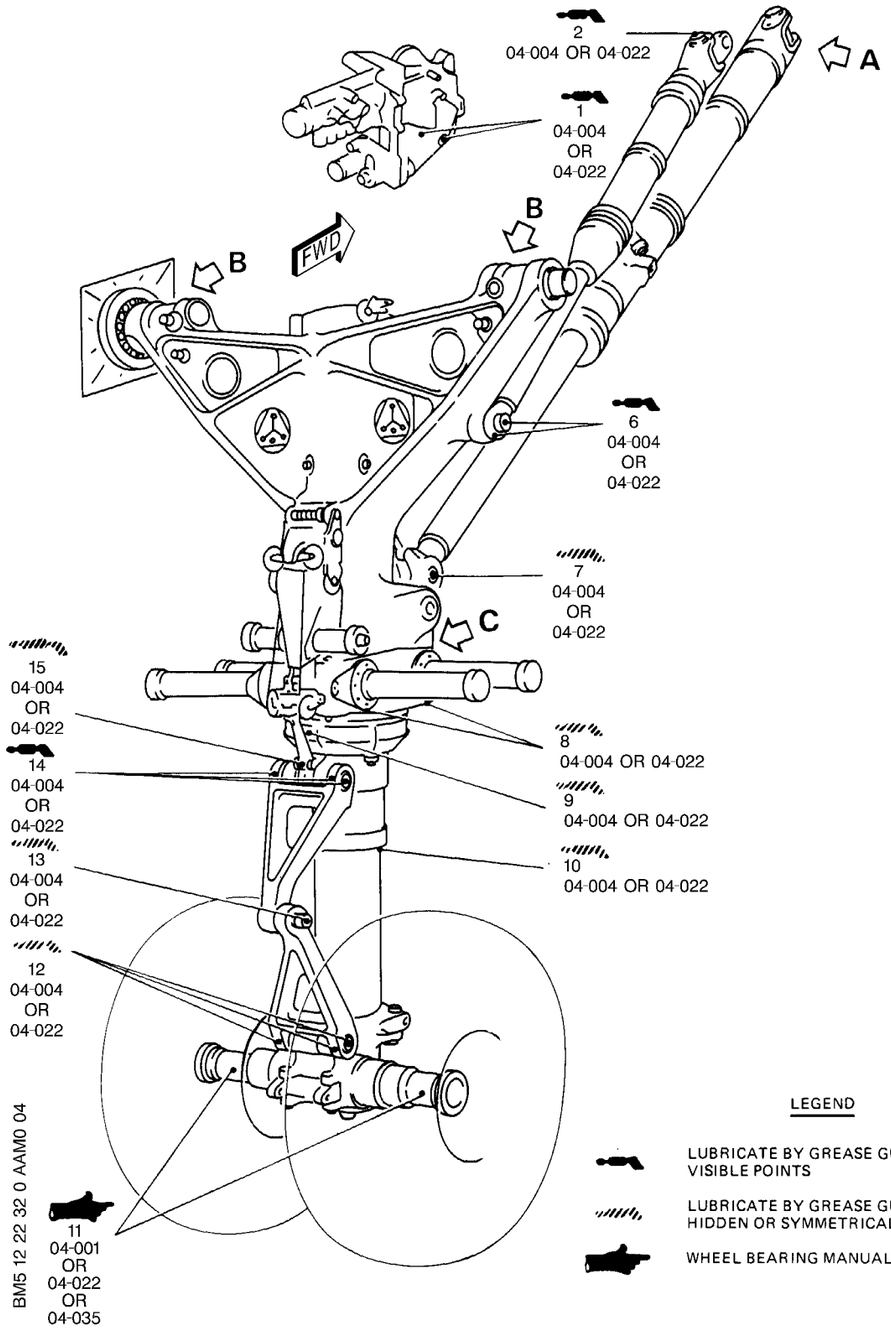
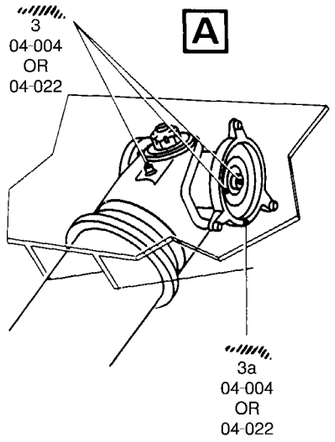
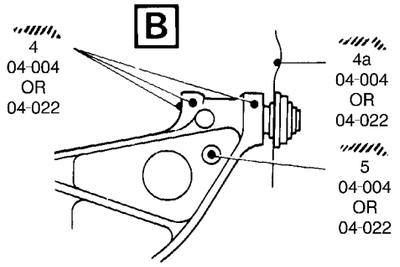
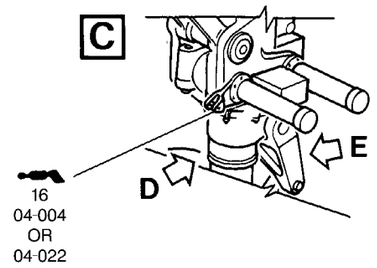
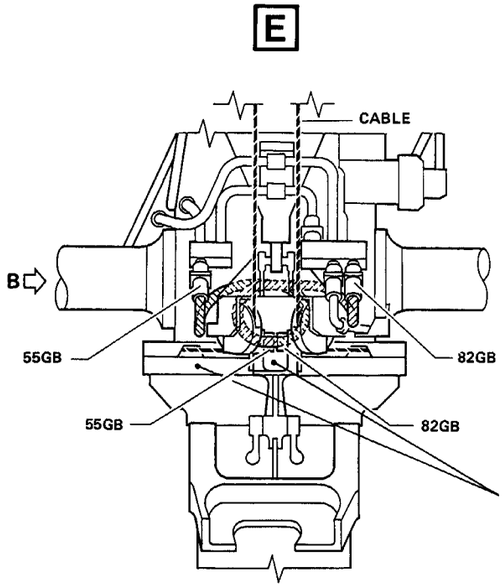
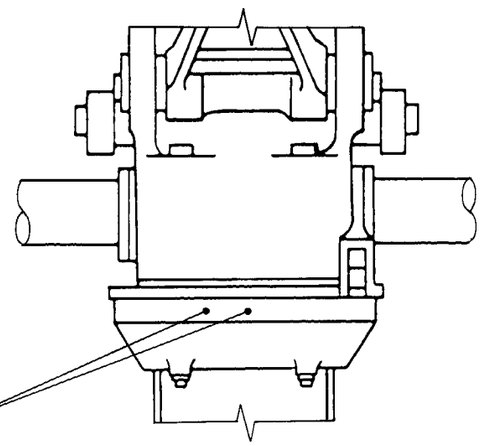








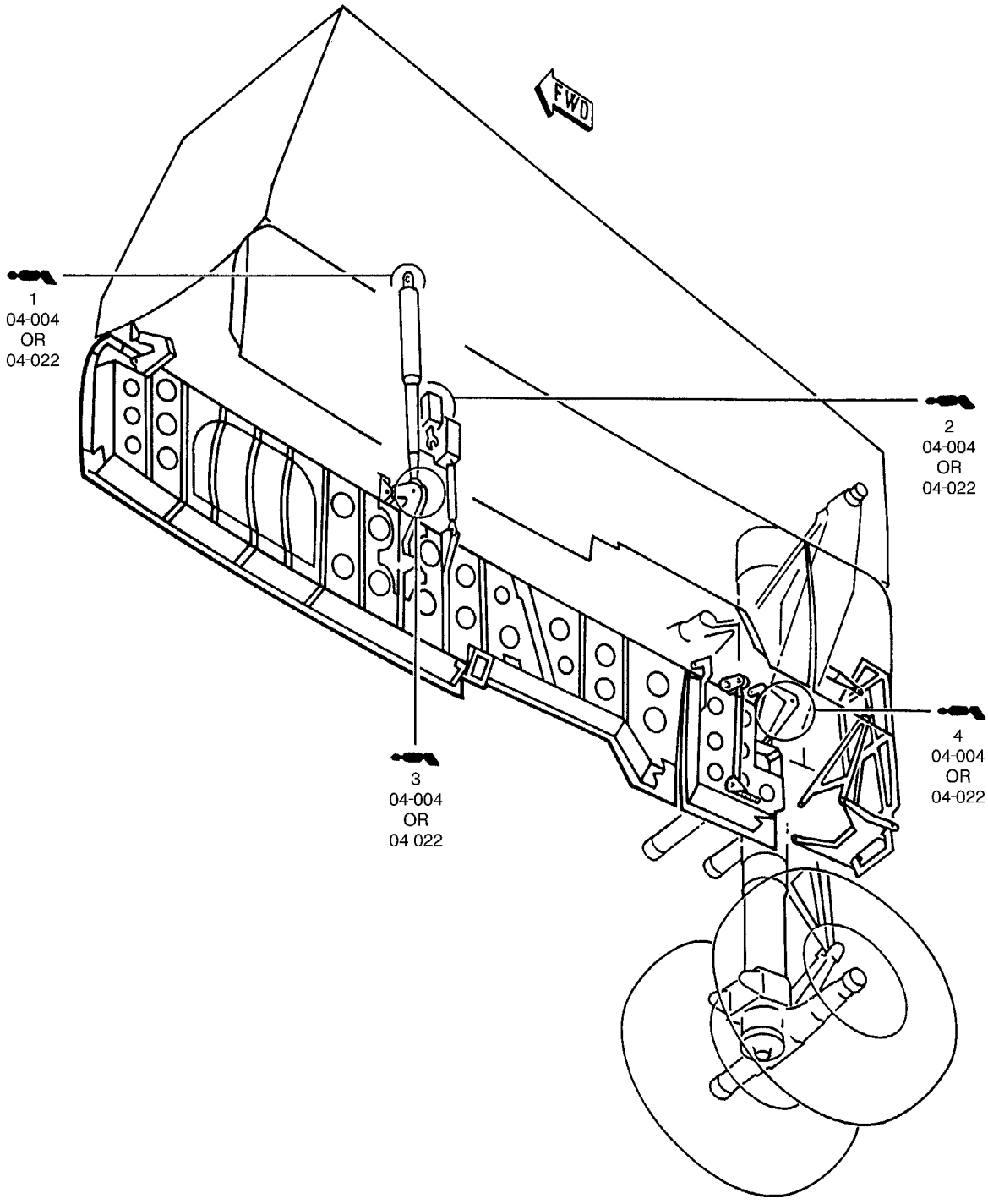




LEGEND

- LUBRICATE BY GREASE GUN : VISIBLE POINTS
- LUBRICATE BY GREASE GUN : HIDDEN OR SYMMETRICAL POINTS
- WHEEL BEARING MANUAL GREASING

Lubrication Points - Nose Gear
Figure 001



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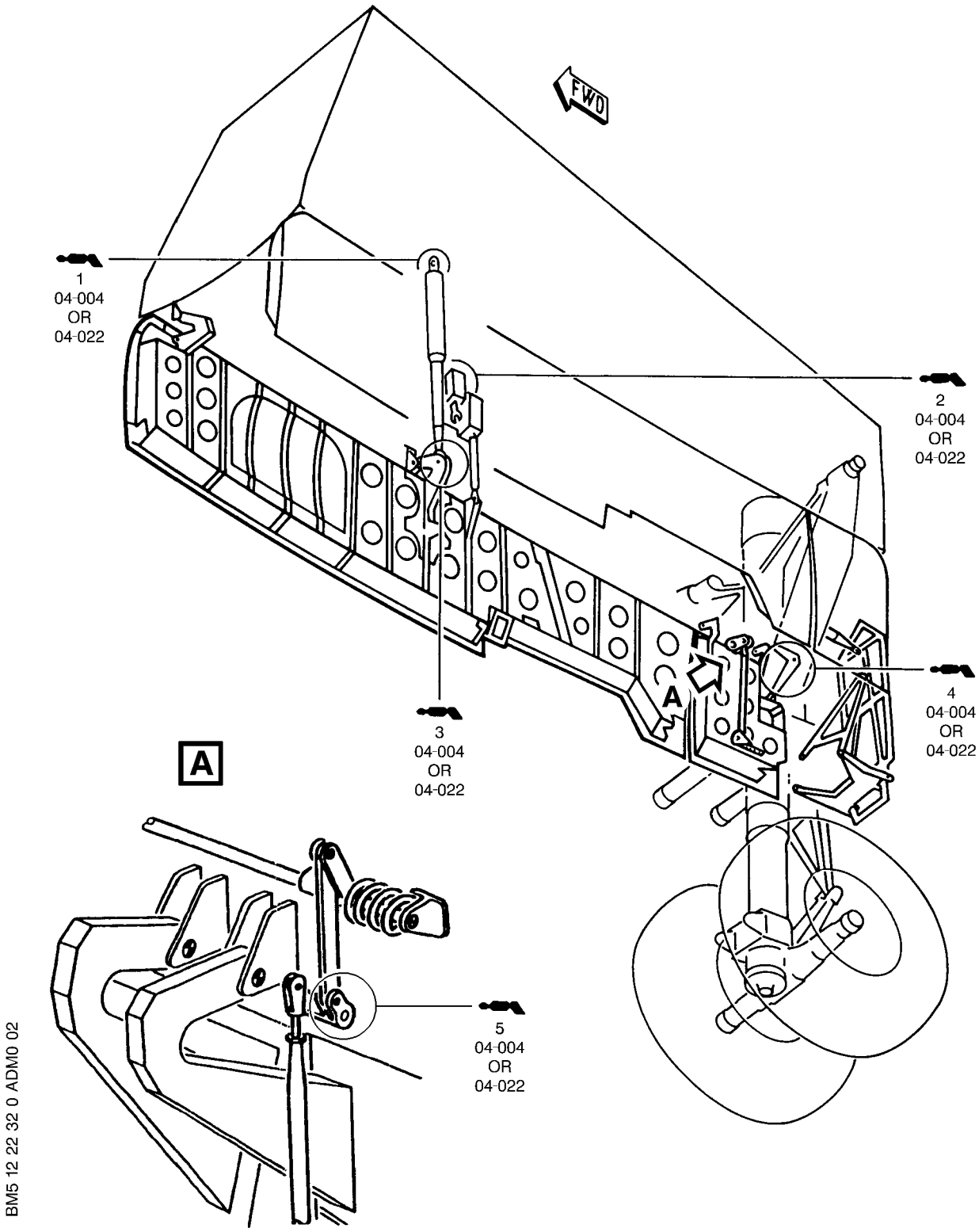
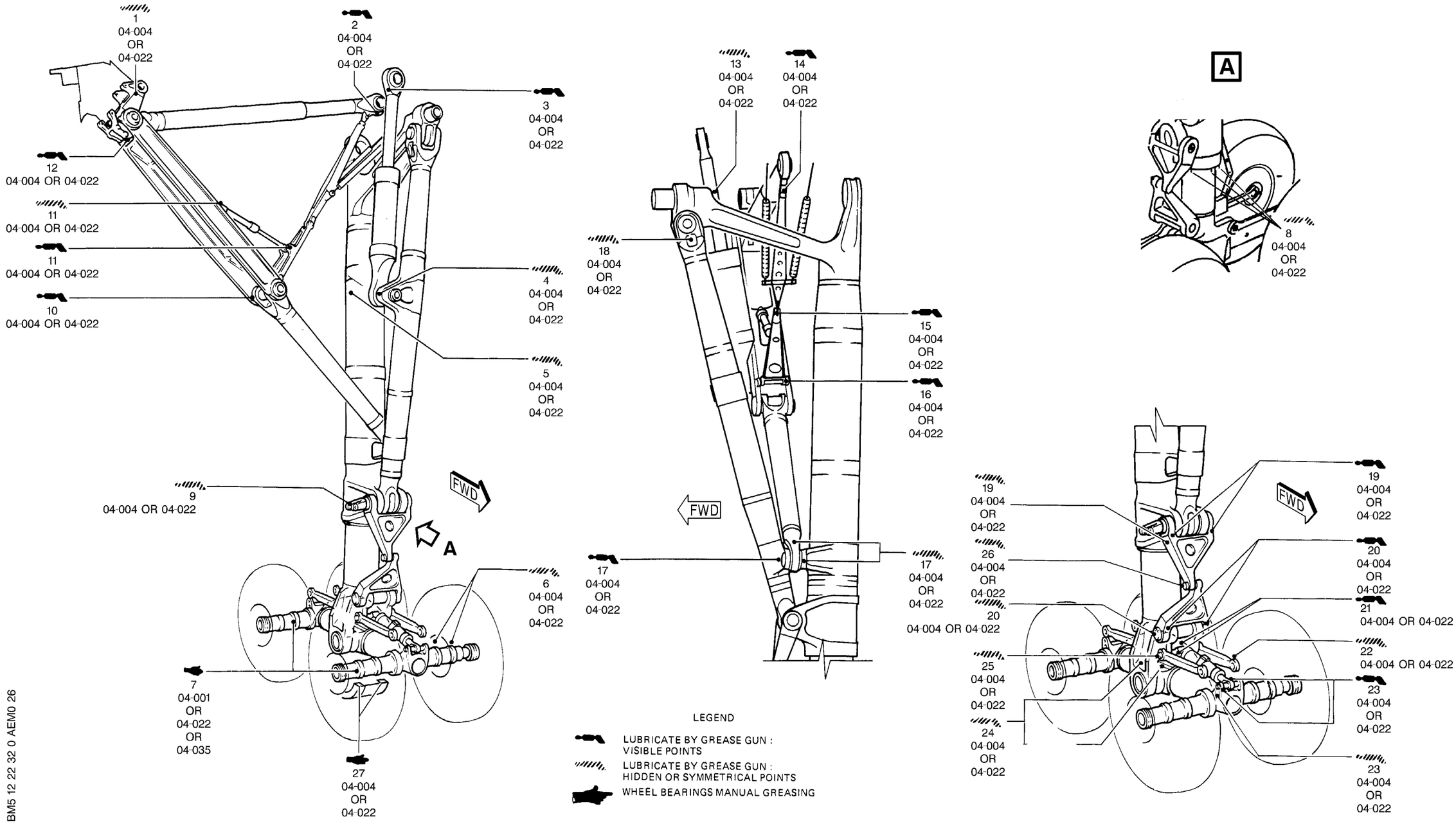
Lubrication Points - Nose Gear Doors
Figure 002



Lubrication Points - Nose Gear Doors
Figure 003



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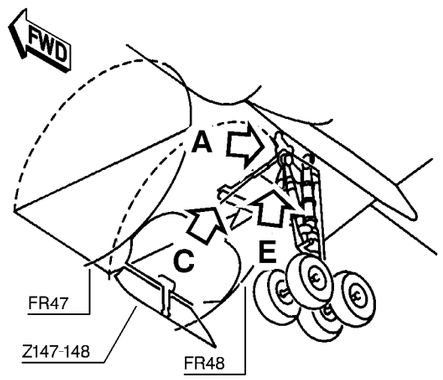
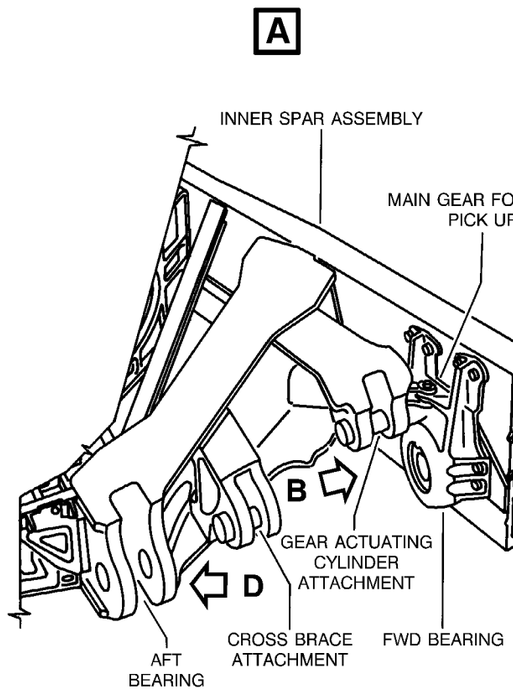
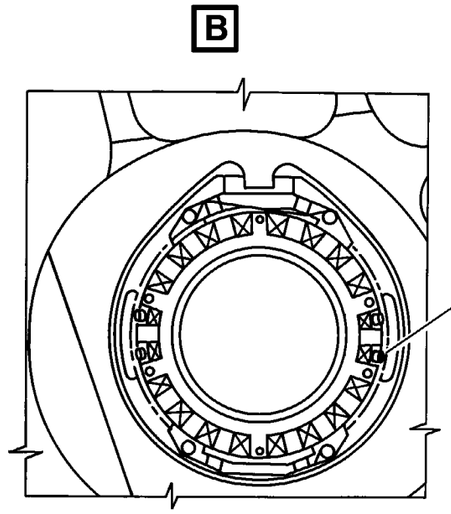
Lubrication Points - Main Gear
Figure 004

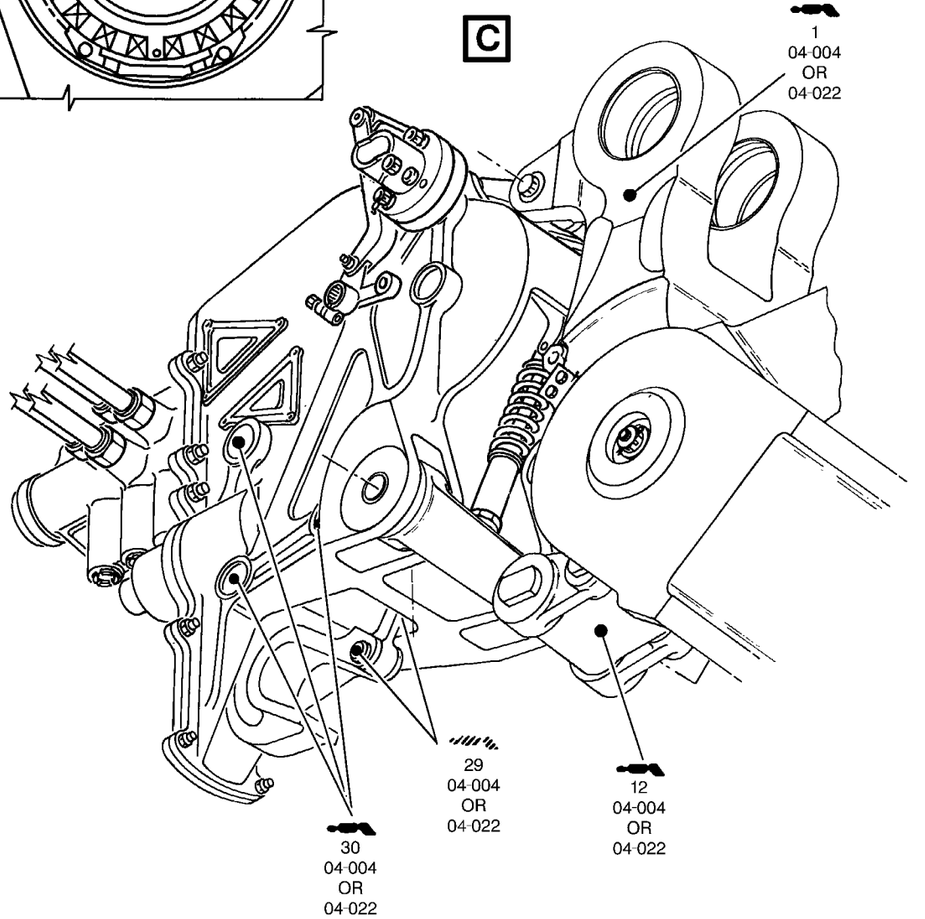
R

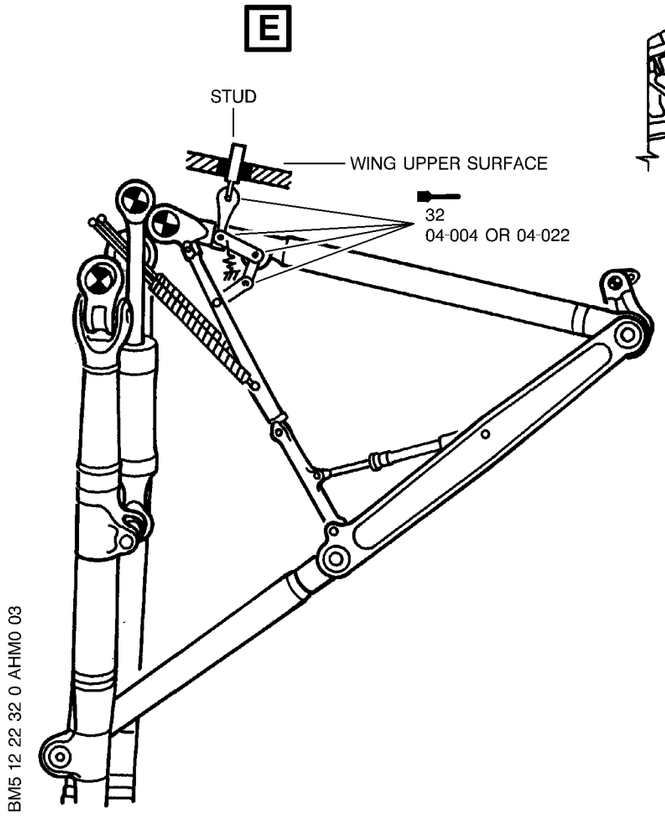


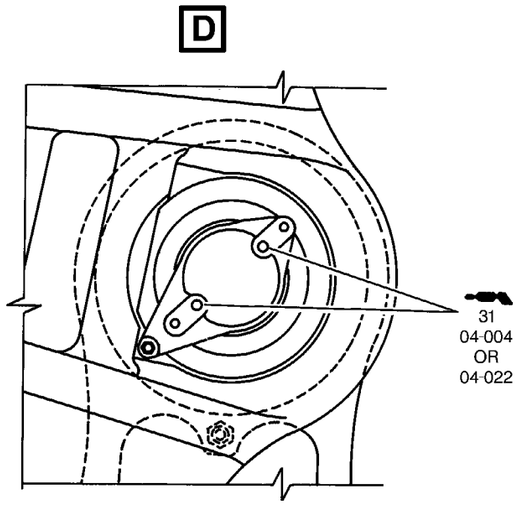




LEGEND
LUBRICATE BY GREASE GUN: VISIBLE POINTS
LUBRICATE BY GREASE GUN: HIDDEN OR SYMMETRICAL POINTS
WHEEL BEARINGS MANUAL GREASING
BRUSH







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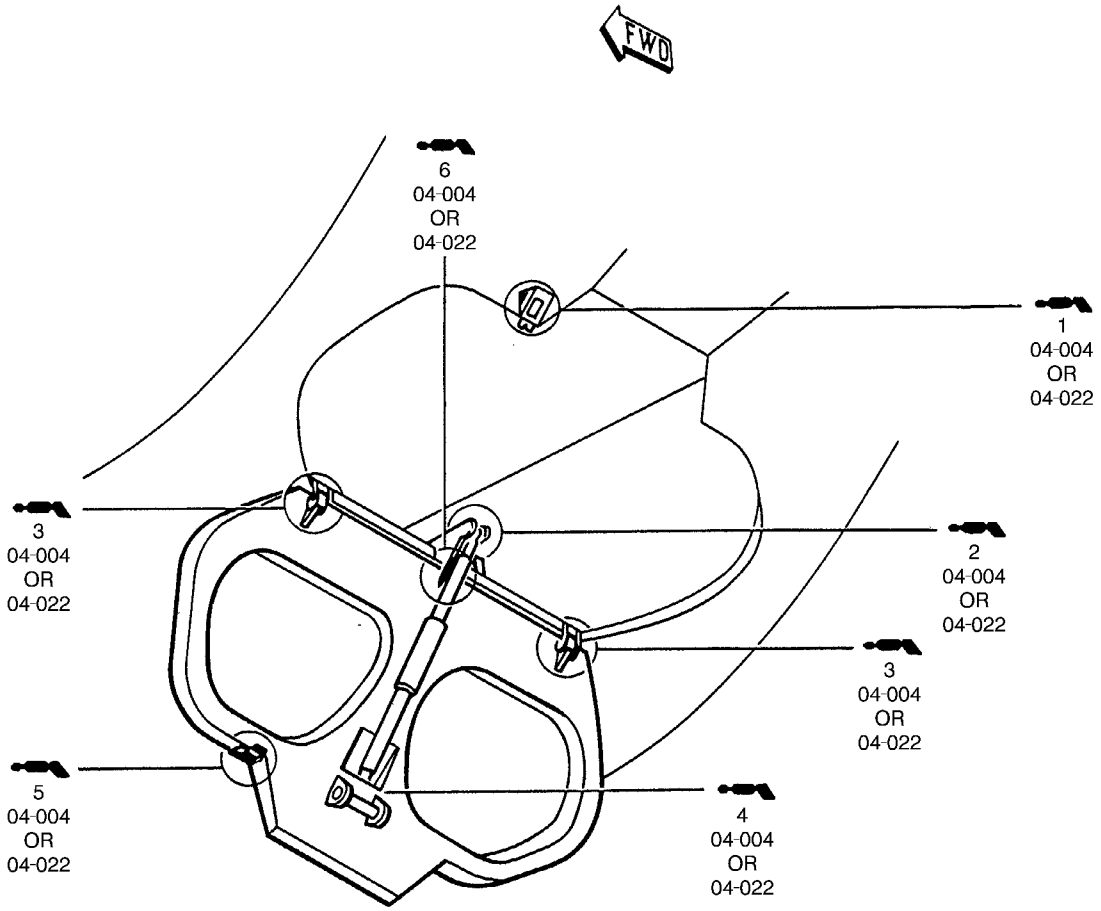
Lubrication Points - Main Gear
Figure 005



BM5 12 22 32 0 BGM0 19

Lubrication Points - Main Gear Door
Figure 006

1. FWD and AFT Passenger/Crew Doors, LH and RH

WARNING : SPECIAL PRECAUTIONS MUST BE FOLLOWED BEFORE CARRYING OUT MAINTENANCE ON OR NEAR PASSENGER/CREW DOORS (REF. 52-10-00, P. BLOCK 301).

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 4.6 to 5.2 m (15 to 17 ft.)
(2)Material No. 04-004	Common Greases (Ref. 20-31-00)
(3)Material No. 04-017	Common Greases (Ref. 20-31-00)
(4)Material No. 05-027	Special Materials (Ref. 20-31-00)
Referenced Procedure	
- 52-10-00, P. Block 301	Passenger/Crew Doors - Special Precautions

B. Procedure

(1)Job Set-Up

(a)Position access platform.

WARNING : SPECIAL PRECAUTIONS MUST BE FOLLOWED.

(b)Make FWD and AFT Passenger/Crew doors LH and RH safe (Ref. 52-10-00, P. Block 301).

(c)Open passenger/crew door.

(2)Lubrication

(Ref. Fig. 001)

(Ref. Fig. 002)

FIG. REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	NO. OF POINTS TO BE LUBRICATED	REMARKS
1	04-004	TELESCOPIC UNIT	1	
2	04-017	GIRT BAR	2	
	or			
	05-027			
6	04-017	OUTER HANDLE ASSEMBLY	11	

(3)Close-Up

(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

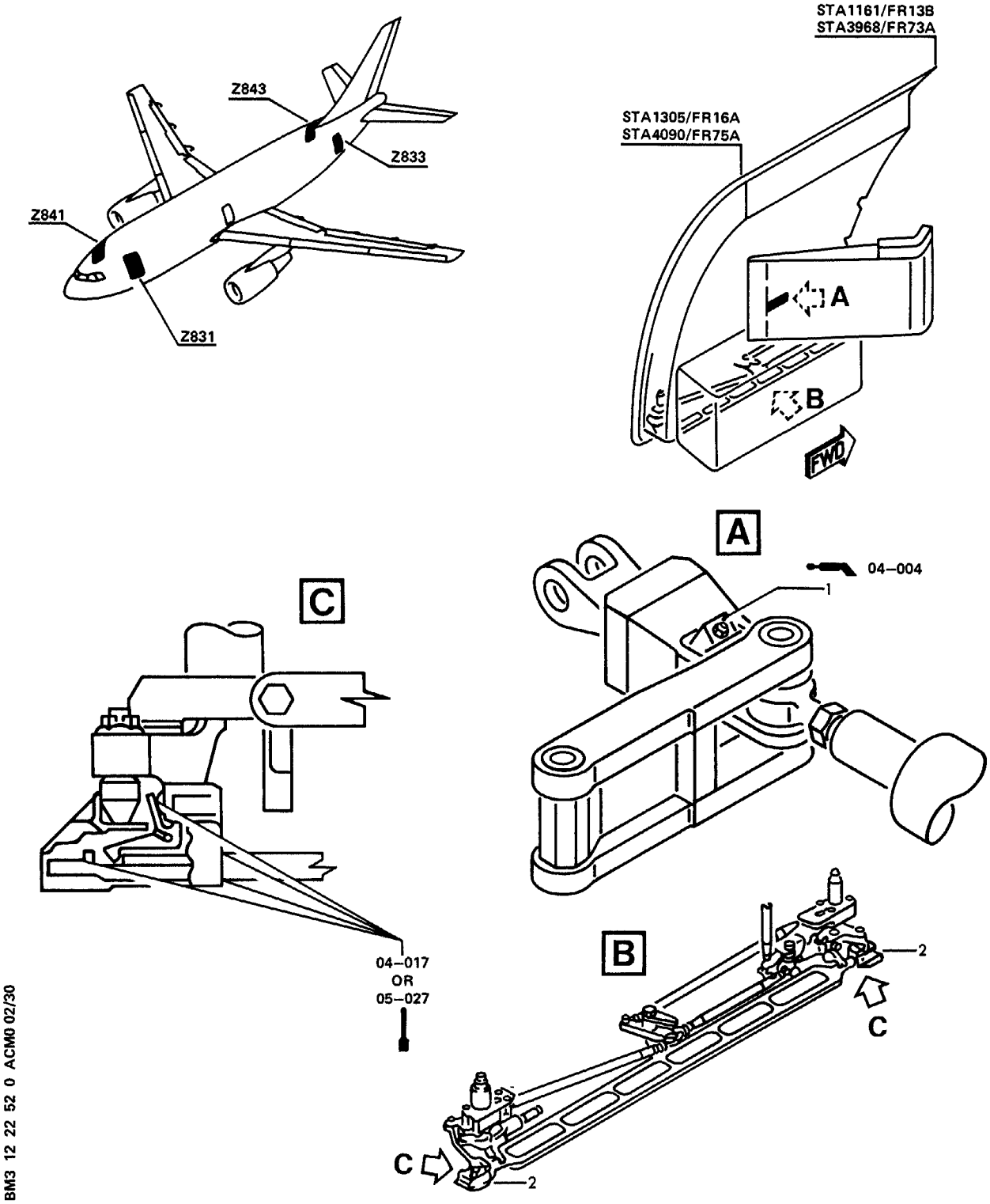
(b)Apply protective film (Material No. 05-027) to all visible interior surfaces and structure of passenger/crew door.

(c)Make certain that drain holes are clean and free from obstructions.

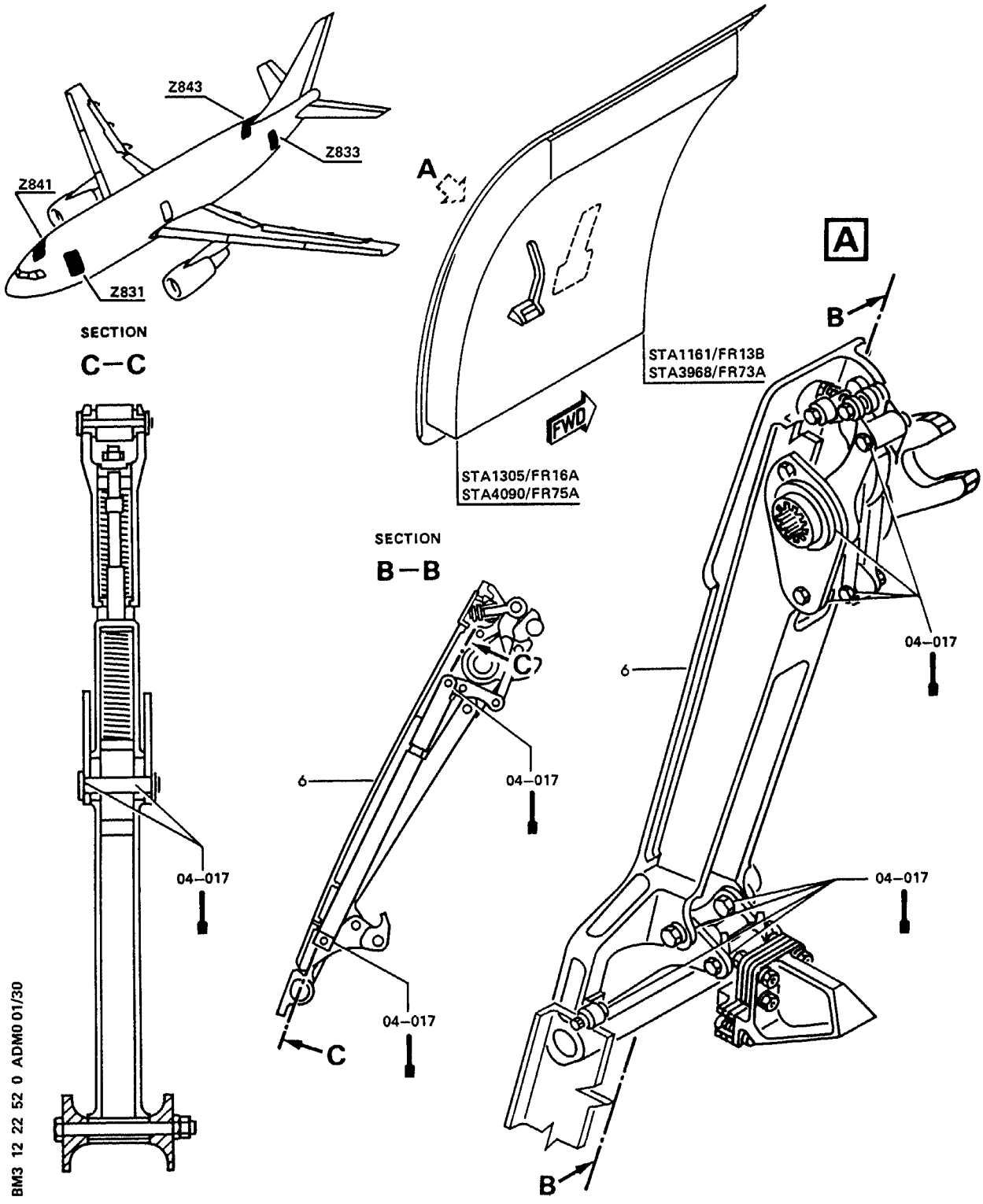
(d)Arm door damper and emergency operation cylinder (Ref. 52-10-00, P. Block 301).

(e)Close passenger/crew door.

(f)Remove access platform.



FWD and AFT Passenger/Crew Doors -
Lubrication of Telescopic Unit and Girt Bar
Figure 001



FWD and AFT Passenger/Crew Doors -
Lubrication of Outer Handle Assembly
Figure 002

2. Not Applicable

3. FWD and AFT Cargo Compartment Doors

WARNING : SPECIAL PRECAUTIONS MUST BE FOLLOWED BEFORE CARRYING OUT MAINTENANCE ON OR NEAR CARGO COMPARTMENT DOORS (REF. 52-30-00, P.BLOCK 301).

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.7 m (9 ft.)
(2)	Electrical Ground Power Unit
(3)	Circuit Breaker Safety Clips and Tags
(4)Material No. 03-001	Oils (Ref. 20-31-00)
(5)Material No. 04-004	Common Greases (Ref. 20-31-00)
(6)Material No. 04-021	Common Greases (Ref. 20-31-00)
(7)Material No. 05-027	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors

B. Procedure

(1)Job Set-Up

(Ref. Fig. 003)

(a)Position access platform.

WARNING : SPECIAL PRECAUTIONS MUST BE FOLLOWED.

(b)Connect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(c)Open access cover 811CR (677FR).

(d)Fully open operating handle (9).

(e)Open cargo compartment door to between 0.5 and 0.8 m (20 and 32 in.) (door lower edge to fuselage) (Ref. 52-30-00, P. Block 1).

(f)Open, safety and tag the following circuit breakers:

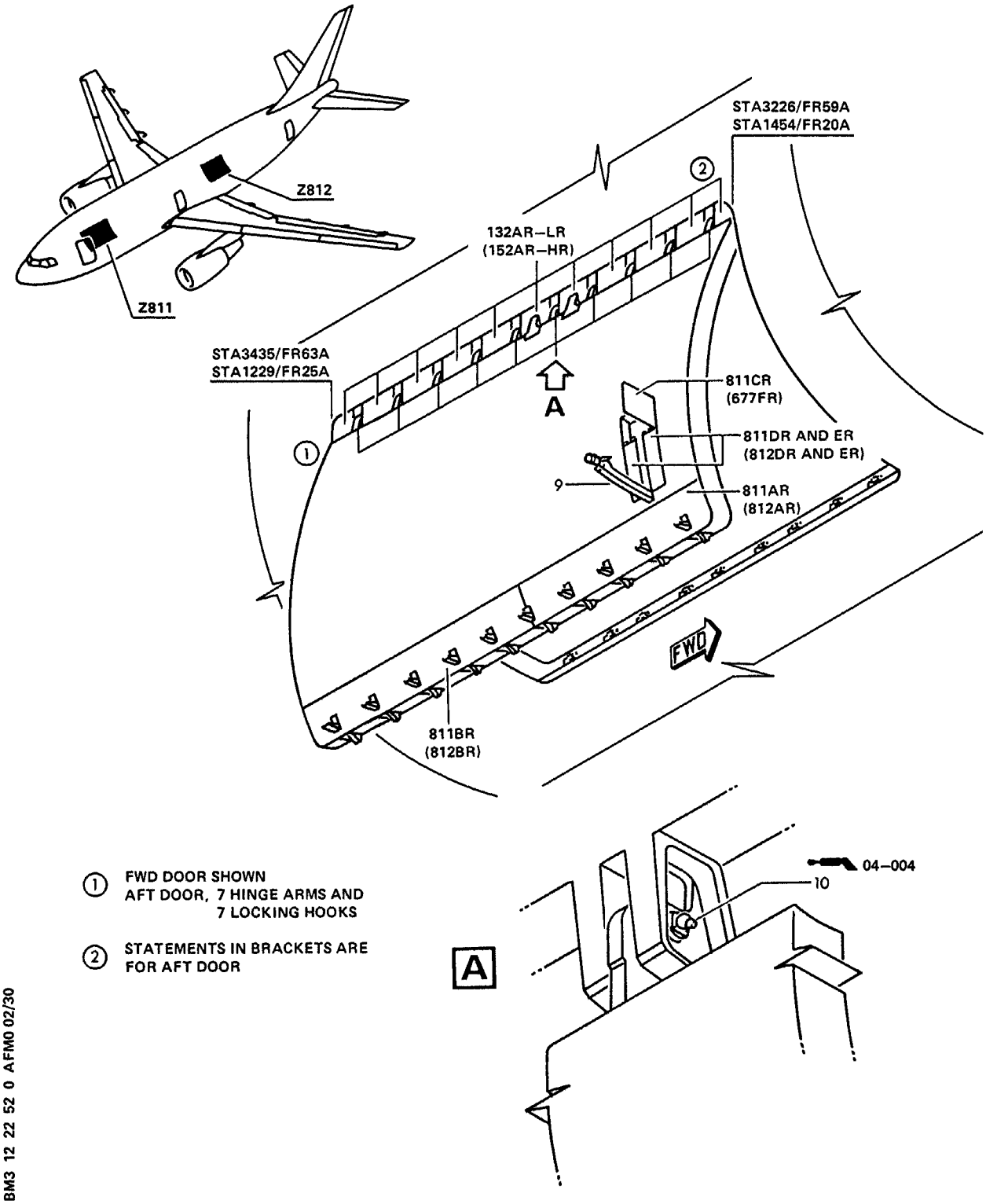
PANEL	SERVICE	IDENT.	LOCATION
133VU	HYDRAULIC/ACCU PRESS CTL AND CARGO DOOR PUMP	7GX	333/T51
101VU	ELEC HYD PUMP	23GX	GEN2/B08

(g)Remove access covers 132AR thru 132LR (152AR thru 152HR).

(h)Remove access covers 811DR and 811ER (812DR and 812ER).

(i)Remove access covers 811AR and 811BR (812AR and 812BR).

NOTE : Designations in brackets refer to AFT cargo compartment door.



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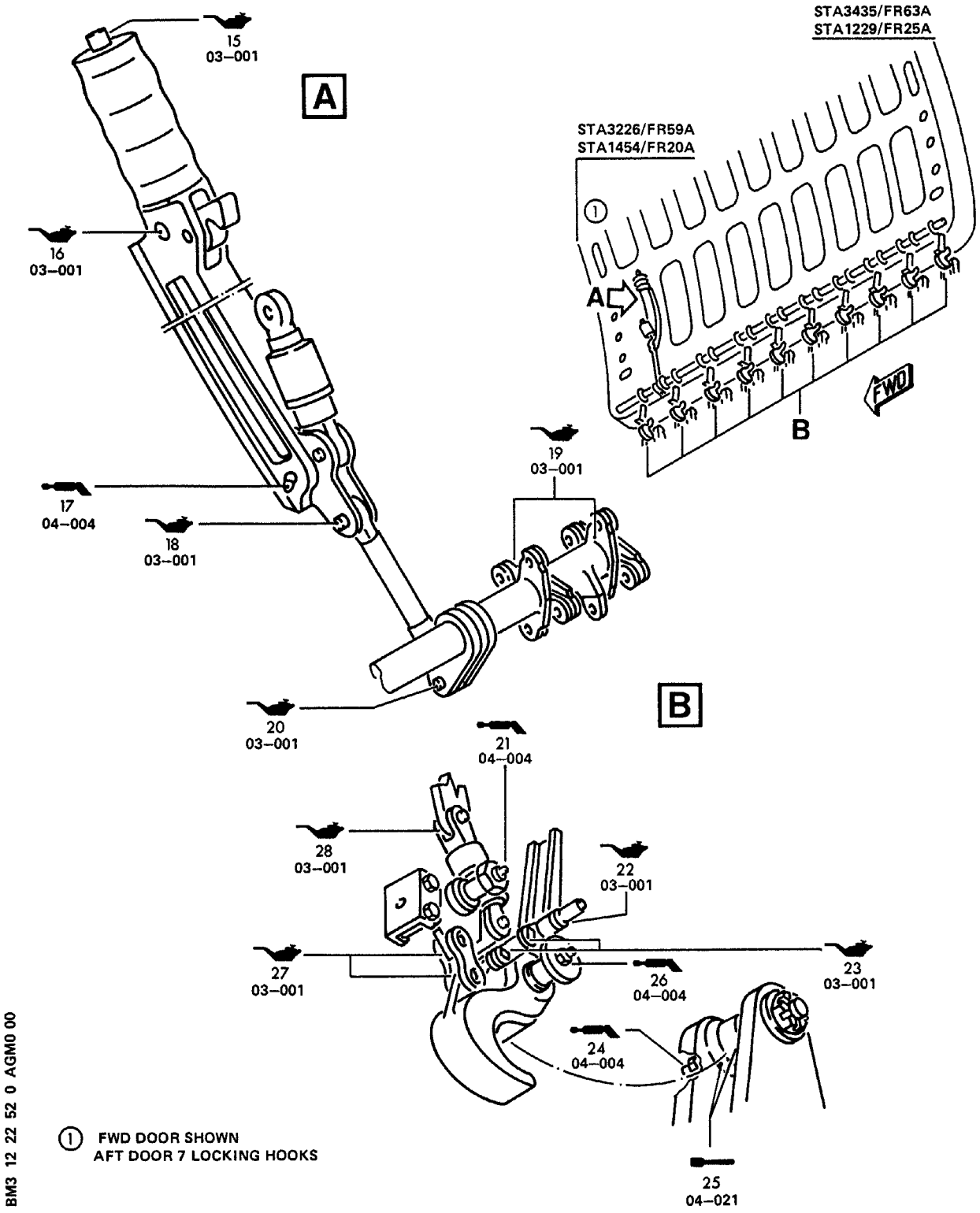
FWD and AFT Cargo Compartment Doors -
Access Covers and Lubrication of Hinge Arms
Figure 003

(2)Lubrication
(Ref. Fig. 003)
(Ref. Fig. 004)

FIG. REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	NO. OF POINTS TO BE LUBRICATED FWD	AFT	REMARKS
10	04-004	Bolts - Hinge Arms	10	7	
15	03-001	Push Button - Operating Handle	1	1	
16	03-001	Bolt - Latch/ Operating Handle	1	1	
17	04-004	Bolt - Operating Handle	1	1	
18	03-001	Upper Connection Control Rod Assy	1	1	
19	03-001	Torque Shaft	20	14	
20	03-001	Lower Connection Control Rod Assy	1	1	
21	04-004	Bolts - Bellcrank	10	7	
22	03-001	Pins - Indicator Flags	10	7	
23	03-001	Eye Bolts and Links	20	14	
24	04-004	Eccentric Bolts	10	7	
25	04-021	Eccentric Bushes	10	7	
26	04-004	Bolts - Locking Hooks	10	7	
27	03-001	Bolts - Connection Link	20	14	
28	03-001	Bolts - Spring Unit	20	14	

(3)Close-Up (Ref. Fig. 003)
(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(b)Apply protective film (Material No. 05-027) to all visible interior surfaces and structure of cargo compartment door.
(c)Make certain drain holes are clean and free from obstructions.
(d)Install access covers 811AR and 811BR (812AR and 812BR).
(e)Install access covers 811DR and 811ER (812DR and 812ER).
(f)Install access covers 132AR thru 132LR (152AR thru 152HR).
(g)Remove safety clips and tags and close circuit breakers 7GX, 23GX.
(h)Close and lock cargo compartment door (Ref. 52-30-00, P. Block 1).
(i)Close access cover 811CR (677FR).
(j)Disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(k)Remove access platform.



FWD and AFT Cargo Compartment Doors -
Lubrication of Locking Mechanism
Figure 004

4. BULK Cargo Compartment Door

WARNING : SPECIAL PRECAUTIONS MUST BE FOLLOWED BEFORE CARRYING OUT MAINTENANCE
R ON OR NEAR CARGO COMPARTMENT DOORS (REF. 52-30-00, P.BLOCK 301).

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.0 m (10.0 ft.)
(2)Material No. 03-001	Oils (Ref. 20-31-00)
(3)Material No. 05-027	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- 52-34-00, P. Block 1	BULK Cargo Compartment Door

B. Procedure

(1)Job Set-Up

(a)Position access platform.

WARNING : SPECIAL PRECAUTIONS MUST BE FOLLOWED.

(b)Unlock and open BULK cargo compartment door, and return exterior door handle to CLOSED and recessed position, after barrel locks have cleared lock spigots (Ref. 52-34-00, P. Block 1).

(c)Remove door insulation mat.

(2)Lubrication

(Ref. Fig. 005)

FIG. REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	NO. OF POINTS TO BE LUBRICATED	REMARKS
29	03-001	Hinge Pin	2	
30	03-001	Rod Eye End Bolt	6	
31	03-001	Universal Joint	2	
32	03-001	Flange Assy. Bearing	3	
33	03-001	Door Operating Handle - Mechanism	1	
34	03-001	Spring Hook - Box Assy.	1	

(3)Close-Up

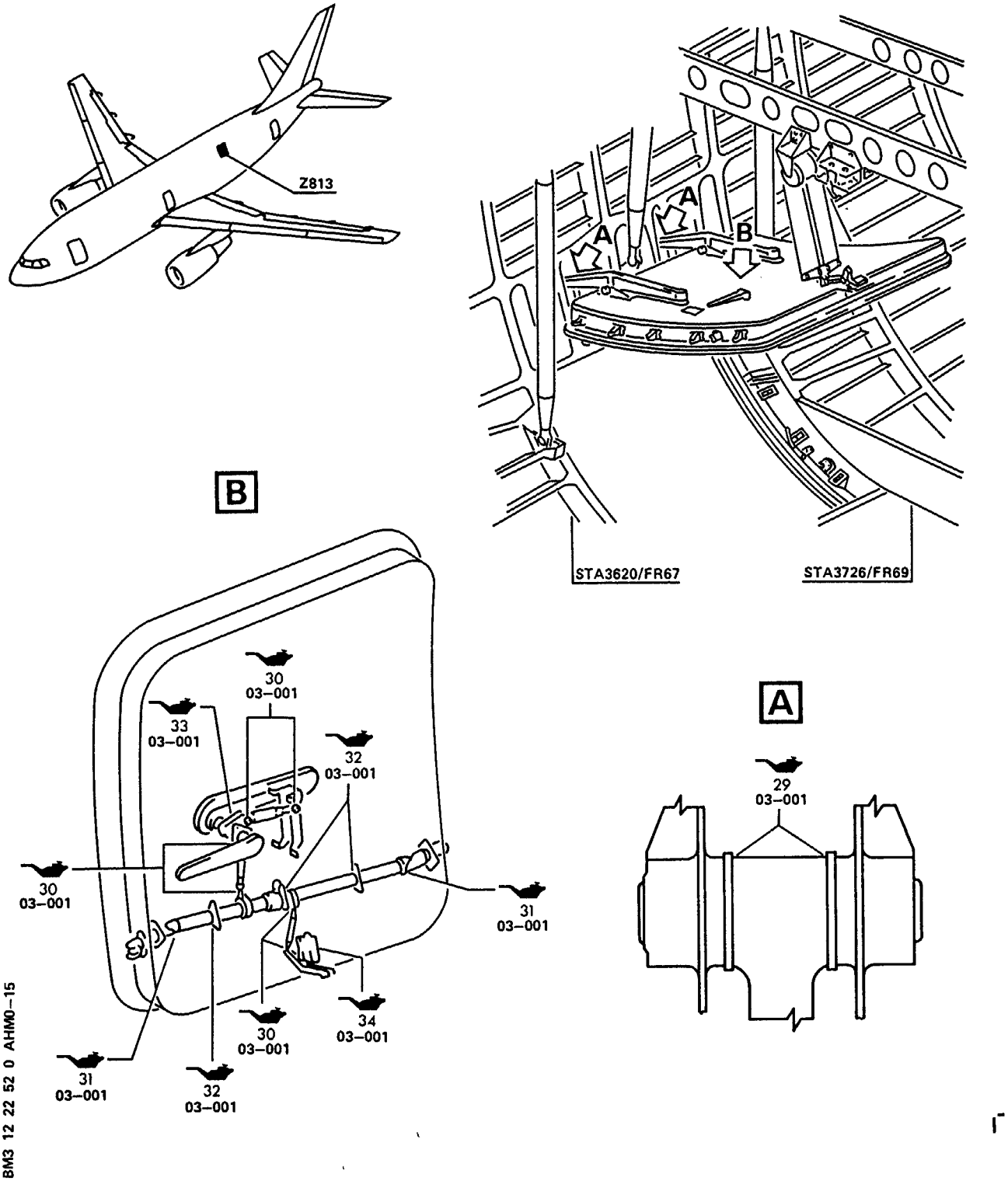
(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(b)Apply protective film (Material No. 05-027) to all visible interior surface and structure of BULK cargo compartment door.

(c)Install door insulation mat.

(d)Close and lock BULK cargo compartment door (Ref. 52-34-00, P. Block 1).

(e)Remove access platform.



BULK Cargo Compartment Door
Figure 005

R **ON A/C 101-200,

5. FWD Lavatory Service Panel Door

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.7 m (9 ft.)
B. Material No. 04-004	Common Greases (Ref. 20-31-00)

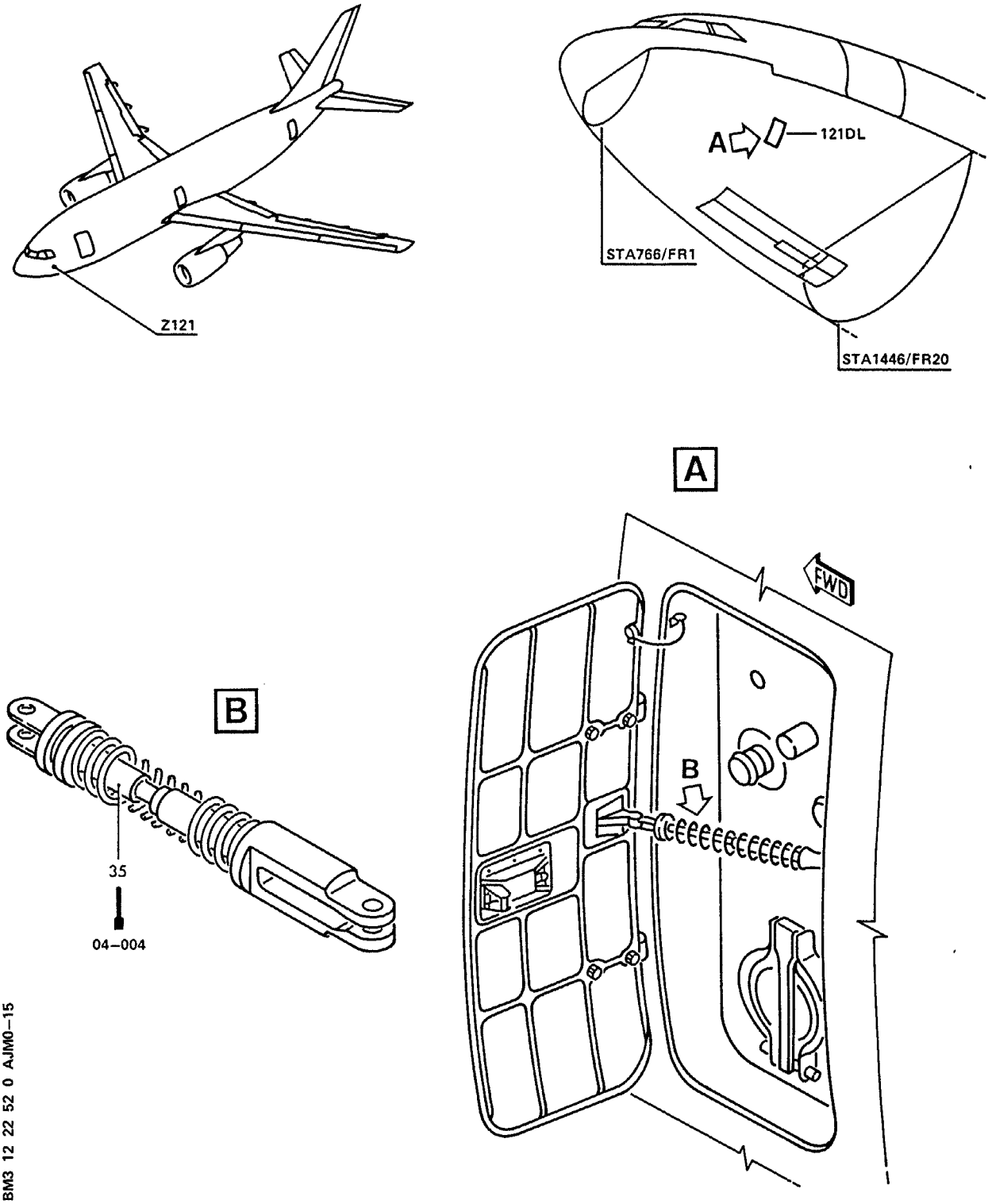
B. Procedure

(1)Job Set-Up
(Ref. Fig. 006)
(a)Position access platform.
(b)Release quick release latch and open panel access door 121DL.

(2)Lubrication (Ref. Fig. 006)

FIG. REF	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	NO. OF POINTS TO BE LUBRICATED	REMARKS
35	04-004	Spring Rod Assy	-	Lubricate sliding shaft

(3)Close-Up (Ref. Fig. 006)
(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(b)Close panel access door 121DL and secure with quick release latch.
(c)Remove access platform.



FWD Lavatory Service Panel Door
Figure 006

1. Radome Equipped with Support Struts

WARNING : PLACE A WARNING NOTICE ON CENTER PEDESTAL IN FLIGHT COMPARTMENT PROHIBITING OPERATION OF RADAR SYSTEM.

CAUTION : LOCALIZER ANTENNA MUST NOT BE USED AS LEVERAGE OR SUPPORT POINT.

A. Reason for the Job

(1)Lubrication of latches, locking mechanism and cables.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.7 m (9 ft.)
(2)	Warning Notices
(3)	Protective Cover for Radome Antenna
(4)Material No. 04-004	Common Greases (Ref. 20-31-00)
(5)	Brush

C. Procedure

(1)Job Set-Up

(a)Position access platform.

(b)Fully open radome and lock support struts.

(c)Protect antenna with cover.

(2)Lubrication

(Ref. Fig. 001)

FIG. REF.	LUBRIC. REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
1	04-004	Latches, Locking Mechanism cables	4	

(3)Close-Up

(a)Clean radome internally.

(b)Remove protective cover from antenna.

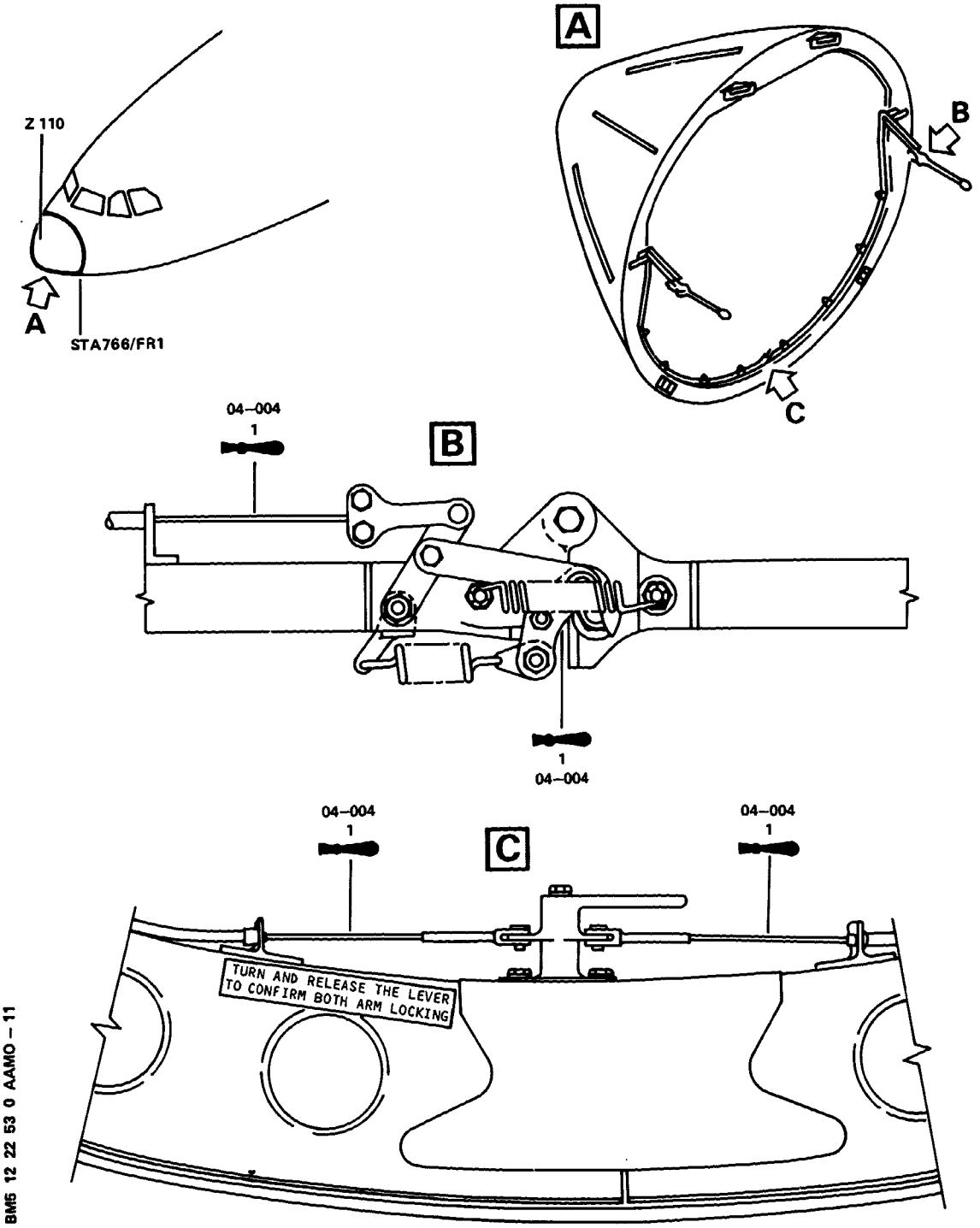
(c)Close radome.

(d)Remove access platform.

(e)Remove warning notices.

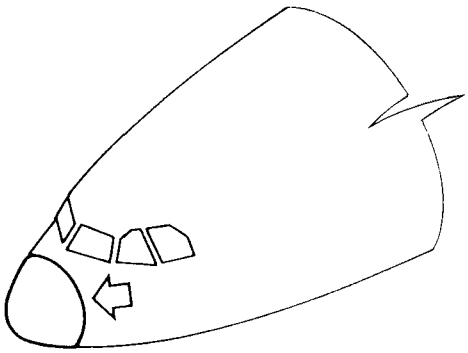
R **ON A/C 004-200,

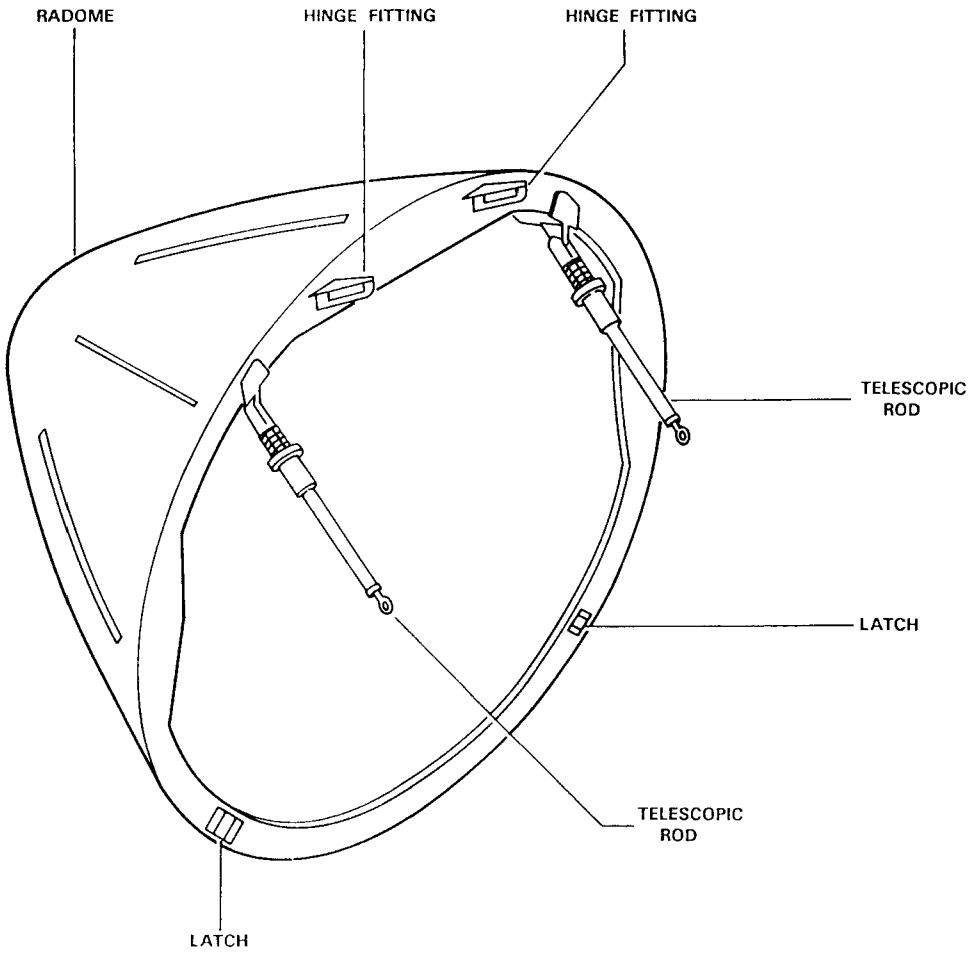
2. Radome Equipped with Telescopic Rods



Radome - Lubrication points
Figure 001

Lubrication not applicable.
(Ref. Fig. 002)
NOTE : Aircraft equipped with telescopic rods radomes may be equipped with support strut radomes.





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Radome Equipped with Telescopic Rods
Figure 002

HORIZONTAL STABILIZER - HINGE AND ATTACH FITTINGS

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION. BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE. BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

A. Lubrication of bearings.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 4 to 6 m (13 to 20 ft.)
B.	Warning Notices
C. 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
D. 98A27901007000	Pin - Rigging, Elevator Control (Qty. 2)
E. Material No. 04-004	Common Greases (Ref. 20-31-00)
Referenced Procedure - 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

3. Procedure

A. Job Set-Up
  (1)Position access platform.
  (2)Make certain that horizontal stabilizer pitch trim control is set at zero, and install locking equipment P/N 97A27302009000 at pitch trim control wheel in flight compartment.
  (3)Make certain that elevator controls are set at neutral, and install rigging pins P/N 98A27901007000 (Qty. 2) in elevator control bellcranks on control mechanism mounting beam in avionics compartment.
  (4)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301) and display warning notices prohibiting repressurization.
  (5)Display warning notices in flight compartment prohibiting operation of flight controls.
  (6)Open access door 313AL.

B. Lubrication (Ref. Fig. 001, 002)

CAUTION : TO PREVENT DAMAGE TO PAINT COATING, MAKE CERTAIN THAT SYNTHETIC GREASE (MATERIAL NO. 04-004) DOES NOT COME IN CONTACT WITH COROGARD EC 843 S.

(1)Lubricate Bearings of Upper and Lower Fittings (Ref. Fig. 001)

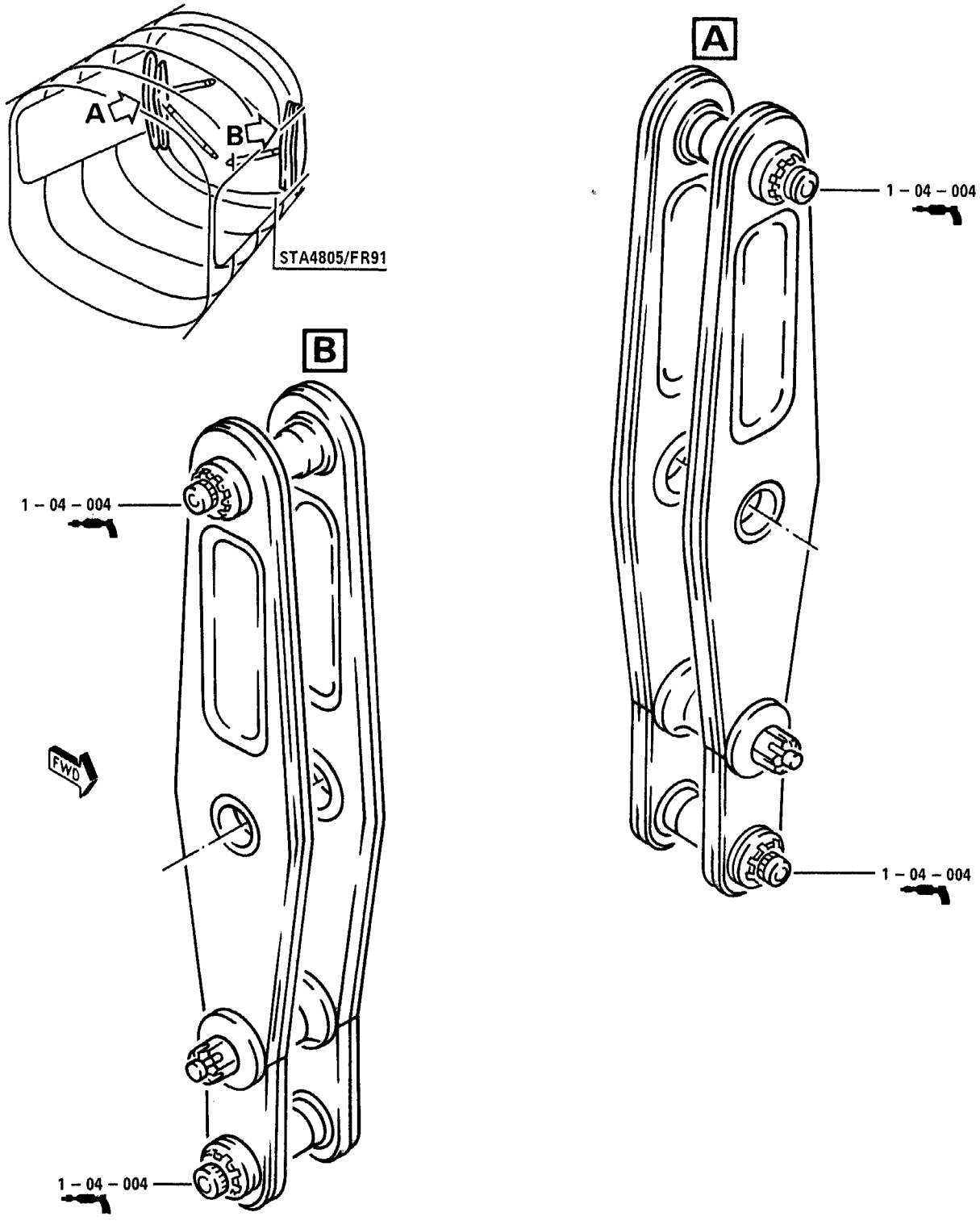
FIG REF	LUBRIC REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
1	04-004	Attach Fittings	4	

(2)Lubricate Bearings of Hinge Fittings (Ref. Fig. 002)

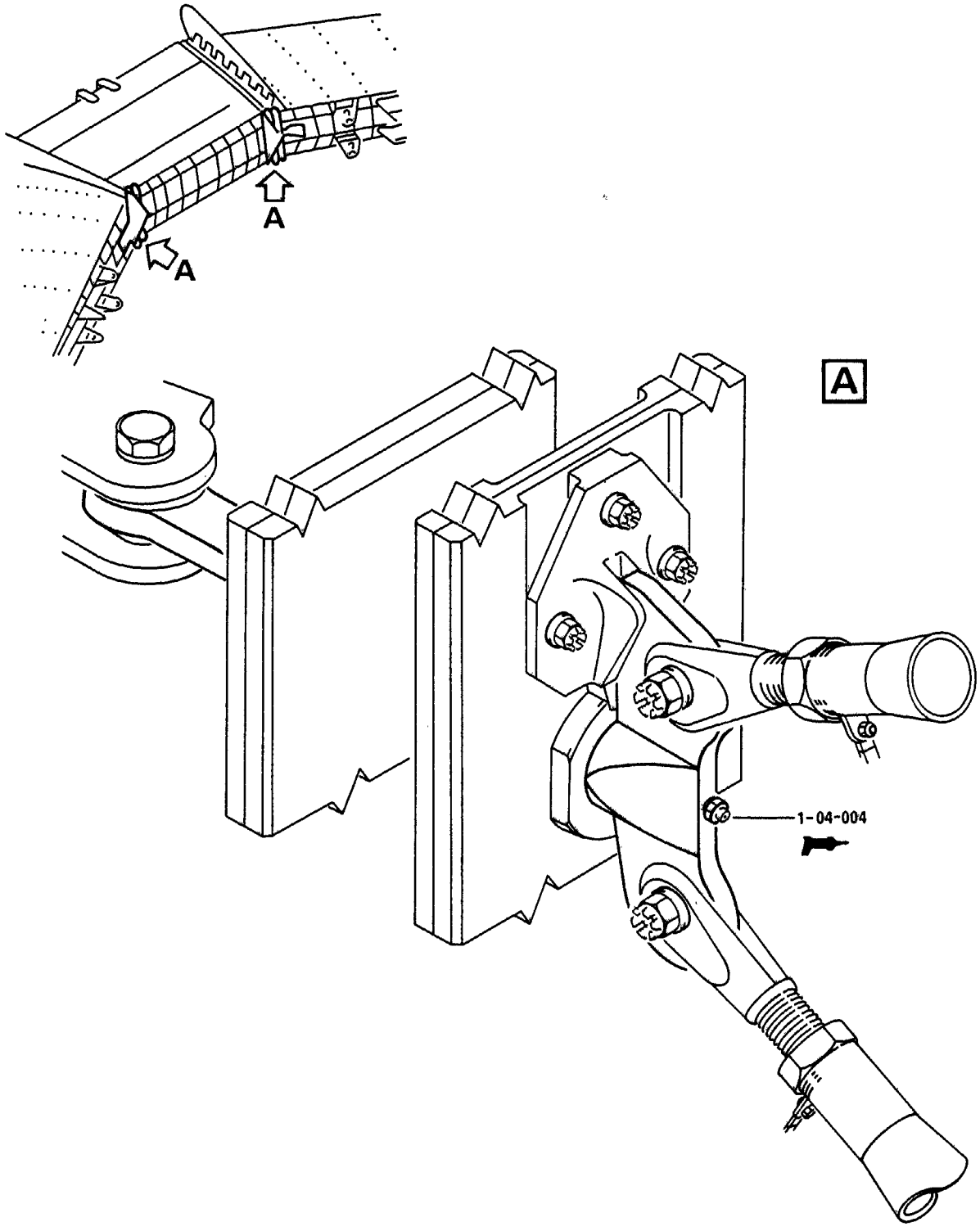
FIG REF	LUBRIC REF	DESIGNATION OF LUBRICATION POINTS	QTY OF LUB PTS	REMARKS
2	04-004	Hinge Fittings	2	

C. Close-Up

(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)Close access door 313AL.
(3)Remove locking equipment P/N 97A27302009000.
(4)Remove rigging pins P/N 98A27901007000.
(5)Remove warning notices.
(6)Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(7)Remove access platform.



Attach Fittings Lubrication Points
Figure 001



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Hinge Fittings Lubrication Points
Figure 002

SLIDING WINDOWS

1. Reason for the Job
   Cleaning and greasing of the sliding side window panel rail mechanism.

2. Equipment and Materials

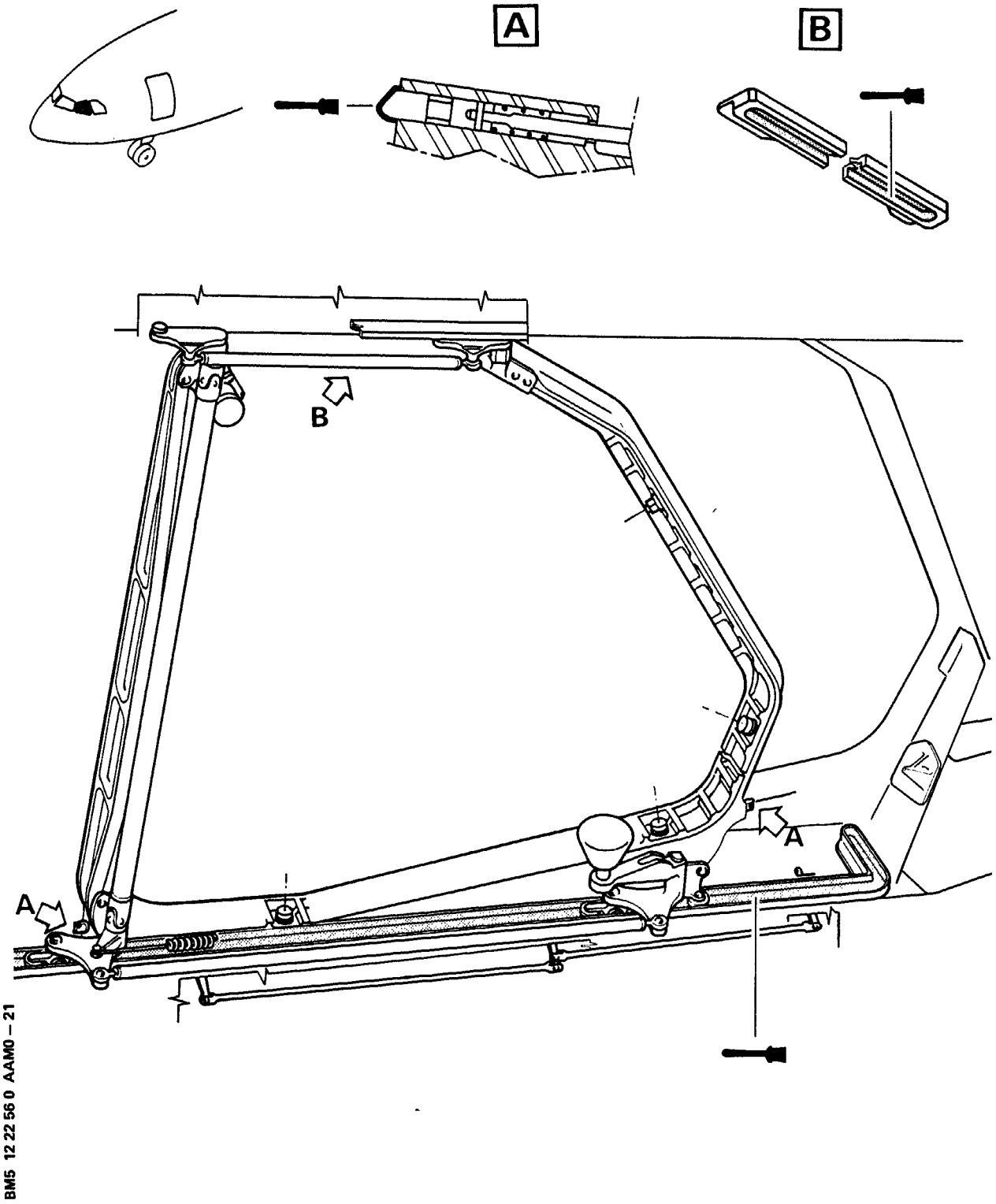
	ITEM	DESIGNATION
	A.	Access Platform 4.5 m (14 ft. 9 in.)
R	B. Material No. 04-004	Grease (Ref. 20-31-00)
	C. Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
	D.	Brushes
	E.	Clean Cloth
	Referenced Procedure	
	- 25-13-21, P. Block 401	Upper Side Wall Panels

3. Procedure

A. Job Set-Up
   (1)Position access platform in front of forward passenger/crew door.
   (2)Remove upper side wall panels (Ref. 25-13-21, P. Block 401).
   (3)Open sliding window panel.

B. Cleaning/Greasing
   (Ref. Fig. 001)
   CAUTION : WINDOW CLEANING AND GREASING ARE PERFORMED IN TWO STEPS.
   1 - CLEANING AND GREASING OF THE AFT PART WITH THE WINDOW CLOSED UNLOCKED.
   2 - CLEANING AND GREASING OF THE FORWARD PART, WITH THE WINDOW UNLOCKED OPEN.
   (1)Using a brush soaked in Material No.11-003, clean the inner side of sliding side window panel upper and lower rails. Wipe using a clean and dry cloth.
   (2)Using Material No. 11-003 also clean studs and lock fittings. Wipe using a clean and dry cloth.
R (3)Smear clean inner side of rails with Grease (Material No. 04-004).
R (4)Smear clean rails, studs and lock fittings with Grease
R (Material No. 04-004).

C. Close-Up
   (1)Check for foreign matters in rails.
   (2)Operate sliding side window panels.
   (3)Install upper side wall panels (Ref. 25-13-21, P. Block 401).
   (4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
   (5)Remove access platform.



Sliding Windows - Lubrication
Figure 001

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform
	B. 98A79003000000	Grease Gun Assembly
R	C. 98A79003000400	Grease Nozzle
R	or	
R	MS24203-1	Grease Nozzle, or equivalent
R	D. Material No.C02-014	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
R	E. Material No.C02-016	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
	Referenced Procedures	
	- 71-13-00, P. Block 301	Cowl Doors
	- 78-31-00, P. Block 501	Thrust Reverser System Control

2. Procedure

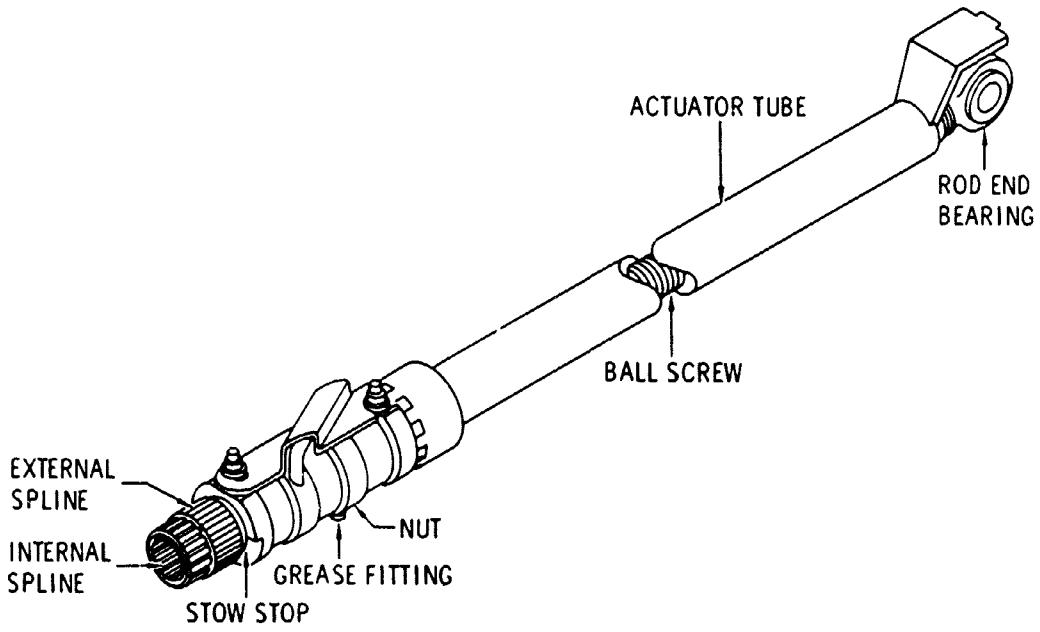
A. Job Set-Up
(1)Open, safety and tag the circuit breakers for the appropriate engine and open fan cowl doors (Ref. 71-13-00, P. Block 301).
(2)Open the thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(3)Install access platform.

R B. Ballscrew Actuators (Ref. Fig. 001, 002)
Lubricate the ball nut assembly of the ballscrew actuators as follows :
(1)Manually release the center drive unit brake (CDU) (Ref. 78-31-00, P. Block 501).
(2)Remove the two bolts securing lockout plate to CDU auxiliary drive pad.
(3)Insert a 0.25 in. (6.4 mm) square drive speed handle into CDU auxiliary drive pad and manually drive translating cowl toward deploy approximately 12-13 in. (304.8-330.2 mm) to expose the ball nuts of the three ballscrew actuators.
(4)Grease each CDU ball nut assembly with C02-016 by applying two pumps of the grease gun to the fitting of each CDU ball nut assembly.
R NOTE : MIL-PRF-23827 (C02-016) is the preferred type of grease. Do not
R mix grease types, and do not mix Type 1 and Type 2 MIL-PRF-23827
R greases.
R (a)Do not mix grease types, and do not mix Type 1 and Type 2 MIL-PRF-
R 23827 greases. If you change the grease type, slowly add the new type
R of grease until all of the old type of grease is removed from the
R actuator, and only the new grease comes out.
(5)Grease each end gear box/ball nut assembly with C02-016 by applying two pumps of the grease gun to the fitting of each end gearbox/ball nut assembly.
R NOTE : MIL-PRF-23827 (C02-016) is the preferred type of grease. Do not
R mix grease types, and do not mix Type 1 and Type 2 MIL-PRF-23827

R greases.
R (a)Do not mix grease types, and do not mix Type 1 and Type 2 MIL-PRF-
R 23827 greases. If you change the grease type, slowly add the new type
R of grease until all of the old type of grease is removed from the
R actuator, and only the new grease comes out.
(6)Manually drive translating cowl back to the stow position but do not apply CDU brake at this time.

C. Flexible Drive Shafts
Lubricate the upper and lower flexible drive shafts as follows :
(1)Remove the two bolts securing the outer case of the lower flex drive shaft to the CDU and separate the flex drive shaft from the CDU.
(2)Pull the core from the casing and wipe old grease from the core with a clean cloth. If necessary, use a stiff bristled brush to remove any dried or caked-on old grease.
(3)Apply a light coat of grease, C02-014, to the outer diameter of the core using a soft swab.
(4)Reinstall the core into the casing (square drive end first), turning as necessary to re-engage the square drive of the end gearbox and temporarily insert splined end into the CDU but do not secure at this time.
(5)Repeat steps (1) through (4) for the upper flex drive shaft.
(6)Rig the fan reverser half (Ref. 78-31-00, P. Block 501)

D. Close-Up
(1)Remove access platform.
(2)Remove safety clips and tags and close circuit breakers. Close fan cowl doors (Ref. 71-13-00, P. Block 301).



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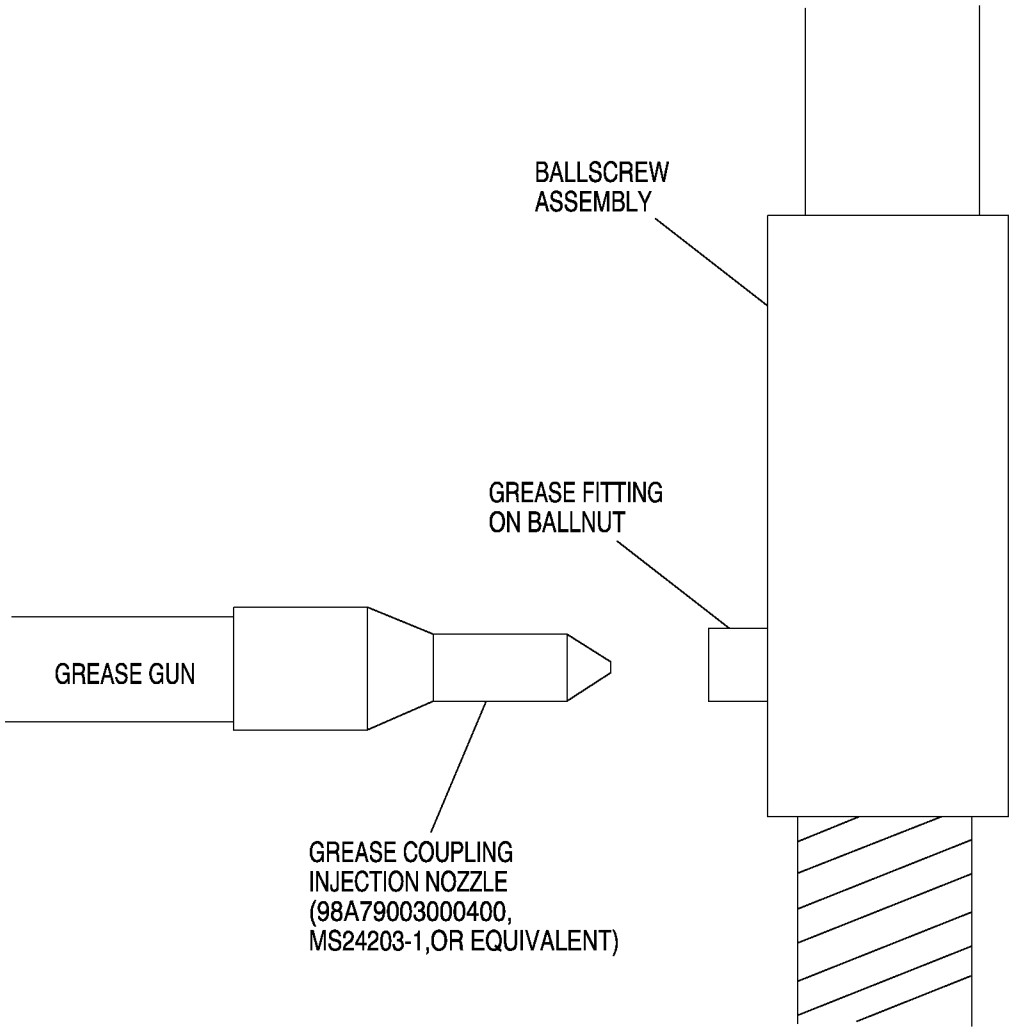
Ballscrew Actuator
Figure 001



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R

Preferred Grease Gun Nozzles
Figure 002

FAN THRUST REVERSER

1. General

A. This procedure provides lubrication instructions for the thrust reverser master and slave actuators, main drive flexible shaft, and translating sleeve actuator drive flexible shafts.

B. The feedback mechanism gearbox is a sealed unit and no line maintenance is required.

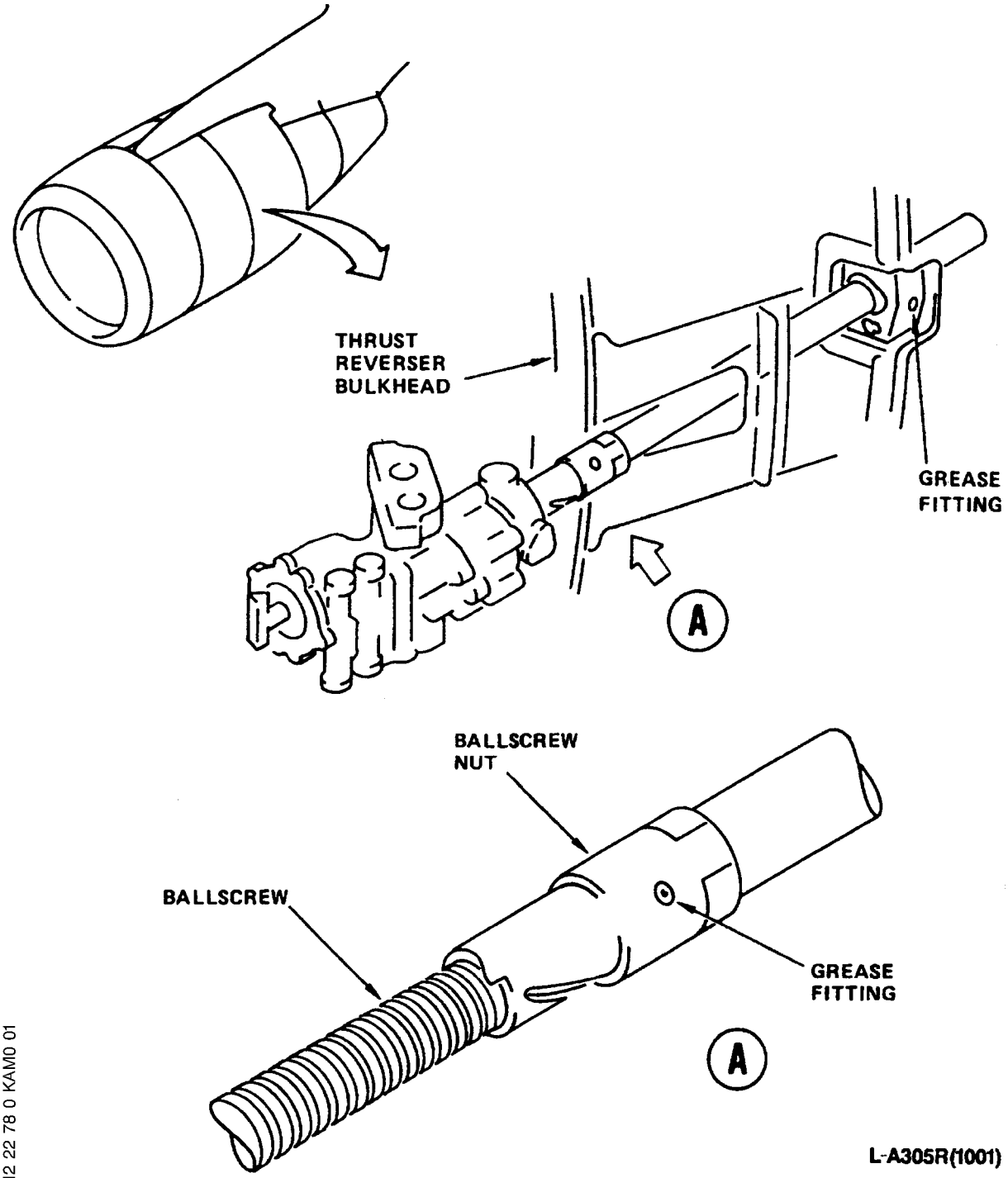
2. Equipment and Materials

ITEM	DESIGNATION
A.	Grease Nozzle
B.	Access Platform
C. Material No.P04-007	Common Greases (Ref. 70-00-00)
D. Material No.P11-004	Cleaning Agents (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-12, P. Block 401	Fan Reverser Flexible Shaft Assy
- 78-32-11, P. Block 201	Thrust Reverser Translating Sleeves
- 78-32-11, P. Block 501	Thrust Reverser Translating Sleeves
- 78-32-12, P. Block 401	Thrust Reverser Cascades

3. Procedure

A. Job Set-Up
(1)Open, safety and tag the circuit breakers for the appropriate engine and open fan cowl doors (Ref. 71-13-00, P. Block 301).
(2)Manually translate thrust reverser translating sleeves to the deploy position (Ref. 78-32-11, P. Block 201).
(3)Install access platform.

B. Lubricate Thrust Reverser Master and Slave Actuators (Ref. Fig. 001)
(1)Remove cascade assembly directly above each translating sleeve actuator (Ref. 78-32-12, P. Block 401).
(2)Manually translate, thrust reverser translating sleeves toward the stow position until lube fittings on actuator sleeve attach fittings are accessible.
(3)Wipe actuator worm screw threads with a clean cloth dampened with Material No.P11-004.
(4)Apply approximately 1.75 cc of grease, Material No.P04-007, at lubrication fittings of ballscrew assemblies.
(5)Manually actuate thrust reverser translating sleeves to the deploy position.
(6)Install thrust reverser cascade assembly at each translating sleeve actuator position. (Ref. 78-32-12, P. Block 401).



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Thrust Reverser Master and Slave Actuator Lubrication
Figure 001

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C. Lubricate All the Thrust Reverser Flexible Shaft
(Ref. Fig. 002).
(1)Remove thrust reverser main drive flexible shaft (Ref. 78-31-12, P. Block 401).
(2)Remove translating sleeves actuators drive flexible shafts (Ref. 78-31-12, P. Block 401).
(3)Remove the synchronous shaft lock flexible shafts (Ref. 78-31-12, P. Block 401).
(4)Pull the core of the flexible shaft assembly out of the assembly casing.
(5)Wipe old grease from the core with a clean cloth. Use a stiff bristle brush to remove dried or caked grease.
(6)Inspect all flex shafts for wear on the outer casing and inner core. If wear is found (Ref. CMM 78-32-34 or 78-32-36) for allowable limits.
(7)Inspect all flex shaft attach flange holes for wear, if worn or elongated, replace the flex shaft.
(8)Apply a light coat of Grease (Material No.P04-007) to the coiled length of the core.

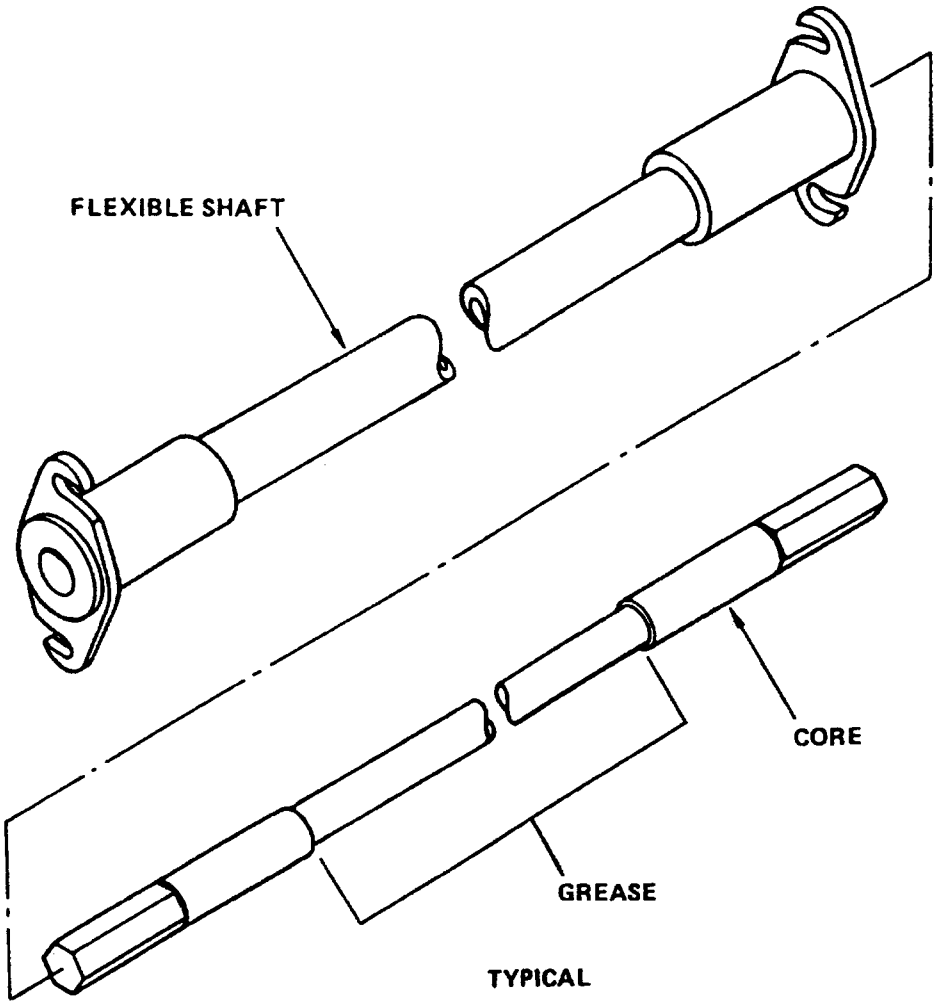
**ON A/C 101-200,

R

D. Assembly Flexible Shaft Assembly
(1)Insert lubricated core into casing. Slowly rotate the core to coat the inner surface of the casing with lubricant.
(2)Remove excess lubricant from external surfaces of the casing with a clean cloth.
(3)Install the synchronous shaft lock flexible shafts (Ref. 78-31-12, P. Block 401).
(4)Install translating sleeves actuator drive flexible shafts (Ref. 78-31-12, P. Block 401).
(5)Install thrust reverser main drive flexible shaft (Ref. 78-31-12, P. Block 401).

**ON A/C 101-200,

E. Close-Up
(1)Remove access platform.
(2)Manually translate the translating sleeves to the stow position (Ref. 78-32-11, P. Block 201) and perform operational test (Ref. 78-32-11, P. Block 501).



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Flexible Shaft Assembly Lubrication
Figure 002

(3)Close fan cowl doors, remove safety clips and tags and close circuit breakers (Ref. 71-13-00, P. Block 301).

DRAINAGE

1. General

The various drainage points and their location heights are specfied in 12-00-00.

Drainage procedures are classified according to the ATA chapter number concerned at subject level.

Example: 12-24-34 - Air Data System Drainage
12-24-38 - Drainage - Potable Water

AIR DATA SYSTEM

1. General

A. Reason for the Job
Elimination of water from air data line system.

2. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 32-22-11, P. Block 301	Nose Gear Main Door - (Ground Door(s) Opening)

3. Job Set-Up

(Ref. Fig. 001)

A. Open nose gear doors (Ref. 32-22-11, P. Block 301).

B. In nose gear well, open drain valve access door.

4. Drainage Procedure

A. Press **TO PUSH DRAIN** drain valves until water contained in air data line system is eliminated.
NOTE : The total pressure line system is drained by means of drain valves located in nose gear well. The total pressure line system of the standby air data system is not fitted with drain valves.
The static pressure line system is drained by means of drain valves located between **STA1711/FR25** and **STA1764/FR26/32**.

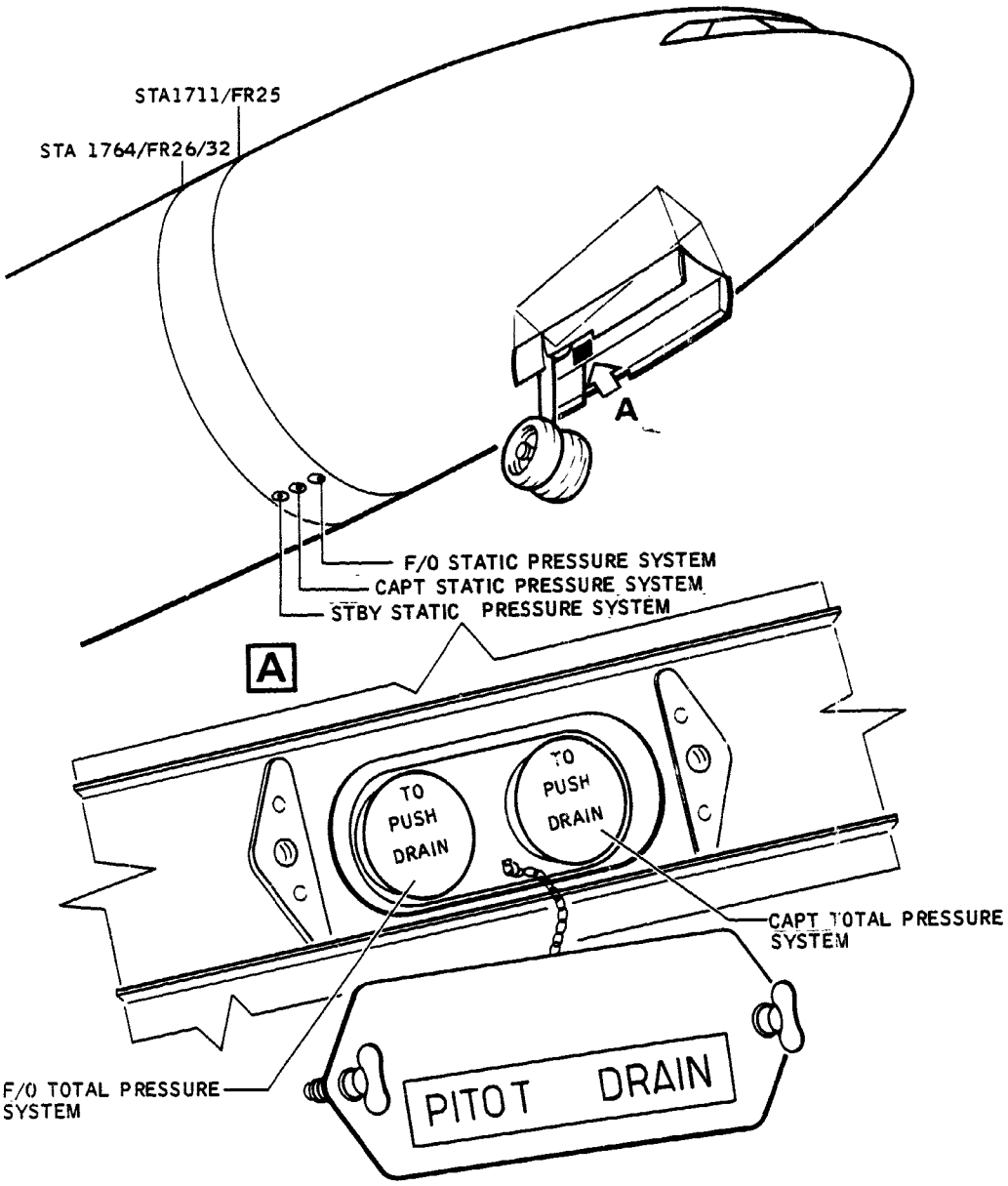
5. Close-Up

A. In nose gear well
- close drain valve access door.

R NOTE : Make certain that the clip of the ball chain or the drain valve
R access door does not press the **TO PUSH DRAIN** drain valves.

B. Close nose gear well doors (Ref. 32-22-11, P. Block 301).

C. Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.



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Location of Air Data Line System Drain Valves
Figure 001

POTABLE WATER SYSTEM - DRAINING

CAUTION : COLD WEATHER PRECAUTION (FREEZING TEMPERATURE), WATER IS TO BE DRAINED AND,
- IF HOT BLEED AIR IS SUPPLIED:
  CLOSE DRAIN VALVES TO PREVENT DAMAGE TO WATER QUANTITY TRANSMITTER BY HOT BLEED AIR.
- IF NO HOT BLEED AIR IS SUPPLIED:
  DRAIN VALVES LEFT OPEN FOR RESIDUAL WATER DRAINAGE.

1. General

A. As a cold weather precaution the potable water system must be drained under the following conditions:

CONFIGURATION			COLD SOAK TIME	WATER TANK DRAIN
AIR CONDITIONING	CABIN TEMPERATURE	OUTSIDE AIR TEMPERATURE		
ON	ABOVE	BETWEEN 0 AND -15 °C (32 and 5 °F)	ANY	NOT REQUIRED
	10 °C (50 °F)	BELOW -15 °C (5 °F)	1 H 15 MIN	
		BETWEEN 0 AND -7 °C (32 AND 19.4 °F)	1 H 30 MIN	
OFF		BETWEEN -7 AND -15 °C (19.4 AND 5 °F)	0 H 45 MIN	REQUIRED
		BELOW -15 °C (5 °F).	ANY	

CAUTION : COLD WEATHER PRECAUTION (FREEZING TEMPERATURE), WATER IS TO BE DRAINED AND,
- IF HOT BLEED AIR IS SUPPLIED:
  CLOSE DRAIN VALVES TO PREVENT DAMAGE TO WATER QUANTITY TRANSMITTER BY HOT BLEED AIR.
- IF NO HOT BLEED AIR IS SUPPLIED:
  DRAIN VALVES LEFT OPEN FOR RESIDUAL WATER DRAINAGE.

NOTE : After required draining, water system shall be refilled with warm water (30 -C (86 -F)) 30 minutes before engine start (Ref. 12-15-38, P. Block 1).

B. The potable water system can be drained either manually or electrically. If the system is drained manually, then the 'fill overflow and drain valve' and the 'motorized drain valve' are opened by separate control handles.

If the system is electrically drained, then the 'fill overflow and drain valve' is opened by the control handle, which in turn activates a micro-switch to open the 'motorized drain valve'.
Complete draining of the water system is accomplished from:
- the potable water service panel and
- the potable water drain panel.
The panels are equipped with the following draining components:

(1)Potable Water Service Panel
- fill/overflow and drain valve control handle
- potable water fill/drain port with cap
- indicator light (2MP).

(2)Potable Water Drain Panel
- drain port
- drain valve control handle.

2. Reason for the Job

A. Draining of the potable water system.

B. Check drain and filler caps of service doors.

3. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platforms, 1 m (3 ft.)
B.	One Container, Capacity 600 l (158.5 US gal.)
C.	One Container, Capacity 30 l (8 US gal.)
D.	Two Drain Hoses, 25.4 mm (1 in.) dia.
E.	Electrical Ground Power Unit - 3-phase, 115/200 V, 400 Hz

Referenced Procedures

- 12-15-38, P. Block 1	Replenishing Potable Water
- 24-41-00, P. Block 301	AC External Power Control

4. Procedure

A. Job Set-Up

(1)Manual Draining

(a)Position access platform and open potable water service panel access door (136BR).

(b)Remove cap from fill/drain port.

(c)Position access platform and open potable water drain panel access door (153AL).

(d)Position container 600 l (158.5 US gal.) under potable water service panel access door (136BR).

(e)Position container 30 l (8 US gal.) under potable water drain panel access door (153AL).

(f)Connect drain hoses 25.4 mm (1 in.) dia. to drain ports and put free end of hoses into the container.
(g)Make certain that the manual shutoff valves in the sanitary units are open.
(h)Make certain that the manual shutoff valves in the galley units are open.
(j)Make certain that FWD/AFT motorized shutoff valves (17MD, 18MD) are open.

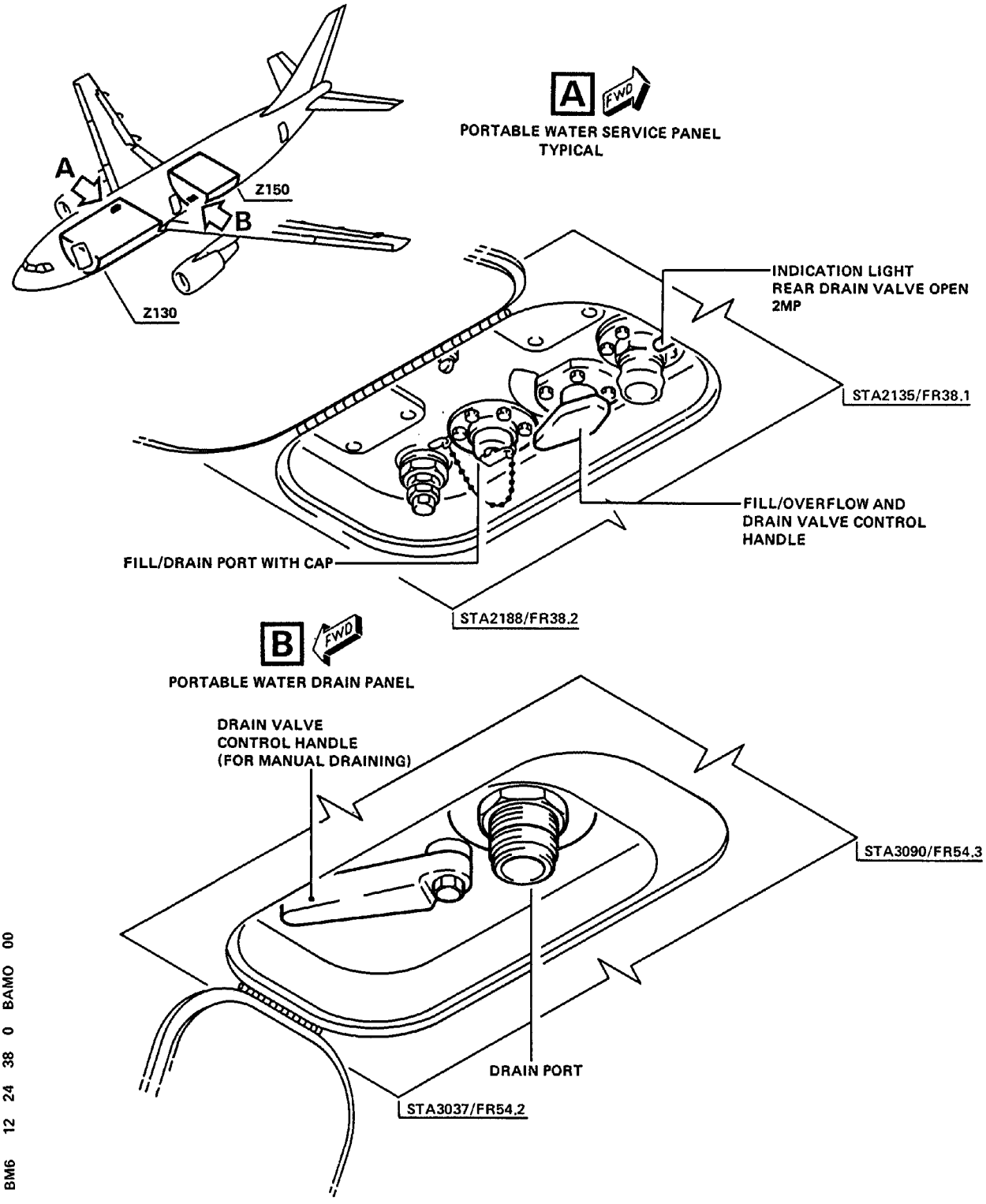
(2)Electrical Draining
(a)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electronics racks ventilation is correct.
(c)Make certain that the following circuit breaker is closed:

PANEL	SERVICE	IDENT.	LOCATION
800VU	WATER SYSTEM	1MP	H 7

(d)Make certain that the manual shutoff valves in the sanitary units are open.
(e)Make certain that the manual shutoff valves in the galley units are open.
(f)Position access platform and open potable water service panel access door (136BR).
(g)Remove cap from fill/drain port.
(h)Position container 600 l (158.5 US gal.) under potable water service panel access door (136BR).
(j)Position container 30 l (8 US gal.) under potable water drain panel access door (153AL).
(k)Connect drain hoses 25.4 mm (1 in.) dia. to drain ports and put free end of hoses into the container.

B. Draining of the Water System
(Ref. Fig. 001)
(1)Manual Draining
(a)Turn and pull 'fill/overflow and drain valve control handle' from NORMAL to DRAIN position.
NOTE : Water drains via drain port of potable water service panel.
(b)Turn drain valve control handle from SHUT to OPEN position.
NOTE : Water drains via drain port of potable water drain panel.
(c)After complete draining, turn 'fill/overflow and drain valve control handle' until locked in NORMAL position.
(d)Turn drain valve control handle to SHUT position.
(2)Electrical Draining
(a)Turn and pull 'fill/overflow and drain valve control handle' from NORMAL to DRAIN position.
NOTE : Check that indicator light (2MP) comes on showing that motorized drain valve (6MP) is open.
NOTE : Water drains via drain ports of potable water service and drain panel.
(b)After complete draining, turn 'fill/overflow and drain valve control handle' until locked in NORMAL position.
NOTE : Check that indicator light (2MP) goes off showing that motorized drain valve (6MP) is closed.

C. Close-Up
R CAUTION : COLD WEATHER PRECAUTION (FREEZING TEMPERATURE), WATER IS TO
R BE DRAINED AND
R - IF HOT BLEED AIR IS SUPPLIED:
R CLOSE DRAIN VALVES TO PREVENT DAMAGE TO WATER QUANTITY
R TRANSMITTER BY HOT BLEED AIR.
R - IF NO HOT BLEED AIR IS SUPPLIED:
R DRAIN VALVES LEFT OPEN FOR RESIDUAL WATER DRAINAGE.
(1)Manual Draining
(a)Disconnect hoses from drain ports.
(b)Wipe dry potable water service and drain panel, and adjacent areas.
(c)Fit cap to fill/drain port.
(d)Check that drain and filler caps of service doors are correctly installed and seals are serviceable.
(e)Close potable water service panel access door (136BR) and remove access platform.
(f)Close potable water drain panel access door (153AL) and remove access platform.
(g)Remove containers.
(h)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Electrical Draining
(a)Disconnect hoses from drain ports.
(b)Wipe dry potable water service and drain panel, and adjacent areas.
(c)Fit cap to fill/drain port.
(d)Check drain and filler caps of service doors are correctly installed and seals are serviceable.
(e)Close potable water service panel access door (136BR) and remove



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Panel Location
Figure 001

access platform.
(f)Remove containers.
(g)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(h)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

UNSCHEDULED SERVICING

1. General

This section gives the information necessary for accomplishment of occasional operations such as wheel change, storage, cold weather operation, analysis of fuel samples, etc.

It is sub-divided into the following sub-sections :

12-31-00 AIRCRAFT PROTECTION
12-32-00 SAMPLING FOR ANALYSIS
12-33-00 PRE-CONDITIONING
12-35-00 CONTAMINATION DETECTION
12-36-00 SYSTEM LINE FLUSHING
12-37-00 WHEEL REPLACEMENT

1. General

A. Safe operation of aircraft in cold weather conditions raises specific problems. Aircraft downtime and delays in flight schedules caused by cold weather problems can be minimized by a program of preventive cold weather servicing.

B. Procedures for cold weather servicing during cold weather must be developed by the operator. This servicing must meet their specific requirements based on:
- their cold weather experience
- the available equipment and materials
- the climatic conditions existing at their bases.

C. This topic contains information to assist the operator in defining, developing and implementing cold weather preventive maintenance procedures that will minimize aircraft downtime and improve the safe operating level of the aircraft in adverse climatic conditions.
These procedures are:
- 12-31-11, P. Block 1 ANTI-ICING PROTECTION
- 12-31-12, P. Block 1 ICE AND SNOW REMOVAL
- 12-31-21, P. Block 1 AIR CONDITIONING
- 12-31-24, P. Block 1 ELECTRICAL POWER
- 12-31-25, P. Block 1 EQUIPMENT/FURNISHINGS
- 12-31-27, P. Block 1 FLIGHT CONTROLS
- 12-31-28, P. Block 1 FUEL
- 12-31-31, P. Block 1 INDICATING/RECORDING SYSTEMS AND NAVIGATION
- 12-31-32, P. Block 1 LANDING GEAR
- 12-31-35, P. Block 1 OXYGEN SYSTEM
- 12-31-38, P. Block 1 WATER/WASTE
- 12-31-49, P. Block 1 AUXILIARY POWER UNIT
- 12-31-51, P. Block 1 STRUCTURE
- 12-31-52, P. Block 1 DOORS
- 12-31-71, P. Block 1 POWER PLANT.

D. Cold Soak Definition
The aircraft is in cold soak configuration when:
- it is parked in cold weather (Outside Air Temperature (OAT) lower than 0 deg.C (32 deg.F)) and
- there is no supply of power to the aircraft (no air conditioning).

2. De-Icing and Anti-Icing Guidelines

A. De-Icing and Anti-Icing Glossary
(1) De-icing is a procedure to remove frost, ice, snow and slush from the aircraft surfaces.
(2) De-icing fluids are normally applied heated. Typical de-icing fluids are:
- Heated water

- Newtonian fluids (ISO or SAE or AEA Type I)
- Mixtures of water and Type I fluid
- Non-Newtonian fluids (ISO or SAE or AEA Type II or Type IV)
- Mixtures of water and Type II or Type IV fluid.

(3) De-icing/anti-icing fluids shall be heated according to the fluid manufacturer's guidelines.
For Type I fluids, water loss may cause undesirable aerodynamic effects.
For Type II or Type IV fluids, thermal exposure and/or water loss may cause a reduction in fluid viscosity, leading to lower holdover times.
CAUTION : AVOID UNNECESSARY HEATING OF FLUID IN VEHICLE TANKS. PROLONGED OR REPEATED HEATING OF FLUIDS (DIRECTLY OR INDIRECTLY) MAY RESULT IN LOSS OF WATER WHICH CAN LEAD TO PERFORMANCE DEGRADATION OF THE FLUID.
Any of the following situations or a combination of them can accelerate the fluid performance degradation:
- low fluid consumption,
- trucks being in standby mode with heating system on for extended periods of time,
- high temperatures in fluid tanks,
- high temperatures in water tanks which are in direct contact with the fluid tanks (no insulation between tanks).

(4) Anti-icing is a precautionary procedure which provides protection against the formation of frost or ice and snow accumulations on the treated surfaces of the aircraft for a limited period of time, the holdover time.

(5) Anti-icing fluids are normally applied cold directly onto clean aircraft surfaces. Typical anti-icing fluids are:
- Newtonian fluids (ISO or SAE or AEA Type I)
- Mixtures of water and Type I fluid
- Non-Newtonian fluids (ISO or SAE or AEA Type II or Type IV)
- Mixtures of water and Type II or Type IV fluid.

(6) Non-Newtonian Fluids (Type II or Type IV) have a viscosity that reduces with increased air flow over the fluid.

(7) Newtonian Fluids (Type I) have a low viscosity that only changes with temperature.

(8) Holdover time is the estimated time during which anti-icing fluids will prevent the formation of frost or ice and snow accumulations on the protected surfaces of the aircraft. The holdover time starts at the beginning of the anti-icing treatment.

(9) De-/anti-icing is a combination of the de-icing and the anti-icing procedures and is performed in one or two steps.

(10) One step de-/anti-icing is carried out with anti-icing fluid, normally heated. The aircraft is de-iced and the fluid that remains on the aircraft gives limited anti-ice protection.

(11) Two step de-icing/anti-icing, as inferred, comprises two completely separate steps:
- the first step is to de-ice the aircraft (remove frost, ice, slush and snow accumulations),
- the second step is then to immediately follow this with an anti-icing procedure.

B. Aircraft performance certification is based upon aircraft having an

uncontaminated or clean structure.

(1)Ice, snow and frost or combinations of them will disturb the airflow, affecting lift and drag. They also increase the aircraft weight.

(2)The aircraft, and especially its surfaces that provide lift and stability, must be aerodynamically clean. If they are not, safe operation is not possible.

(3)If the fuel temperature is below freezing point and the aircraft is subject to precipitation, clear ice may form on the wings (wing tank area), even if the outside temperature is as high as 15 deg.C (59 deg.F).

(4)An aircraft that is ready for flight must not have ice, snow, slush or frost adhering to its critical flight surfaces (wings, vertical and horizontal stabilizers and rudder).

NOTE : A frost layer less than 3 mm (1/8 in.) on the underside of the wing, in the area of fuel tanks, is permitted without effect on takeoff performance if it is caused by cold fuel (low fuel temperature, OAT above freezing and high humidity).

(5)A contamination check of the aircraft must cover all parts of the aircraft. You must do this visual inspection from a position which gives a clear view of all surfaces. Because accumulations of clear ice are sometimes not easily visible, it is recommended that critical surfaces (wings, vertical and horizontal stabilizers and rudder) are inspected with your hands.

(6)Weather conditions determine when the aircraft de-/anti-icing must be carried out.

(7)During checks on the ground, electrical or mechanical ice-detectors must not replace physical checks.

(8)If the aircraft arrives at the gate with the flaps/slats in a position other than fully retracted, you must inspect those flaps/slats, and if necessary de-ice before retraction.

C. De-icing and/or Anti-icing Equipment and Materials

(1)Type I Fluids

Type I fluids are normally used for aircraft de-icing and have only a limited effect when used for anti-icing purposes.

Type I fluids are normally used for aircraft de-icing. These fluids contain at least 80 % by volume of either:

- Monoethylene-glycol
- Diethylene-glycol
- Monopropylene-glycol
- or a mixture of these glycols.

The other 20% comprises inhibitors to restrict corrosion and increase the flash-point together with water and wetting agents.

These fluids show a low viscosity which only changes with temperature. The freezing point of a water/glycol mixture will vary with the amount of water contained in the fluid. It must be noted that the lowest freezing point of concentrated Type I fluid is approximately -10 deg.C (+14 deg.F) whereas the lowest temperature protection will be found with a 60%/40% mixture of Type I fluid and water whose freezing point will be below -50 deg.C (-58 deg.F). However, due to the lower viscosity, it flows off the wing more easily. Therefore a 50/50 mixture of Type I

fluids and water is normally used.

(2)Type II or Type IV fluids contain a least 50% by volume of either:
- Monoethylene-glycol
- Diethylene-glycol
- Monopropylene-glycol
- or a mixture of these glycols.

The other 50% comprises:
- inhibitors to restrict corrosion and increase the flash-point
- water and wetting agents to allow the fluid to form a uniform film over the aircraft surfaces
- thickening agents to enable the fluid to adhere to the aircraft surfaces for longer periods.

Type II or Type IV fluids have a longer holdover time than Type I fluids.

(3)Fluid dilution

Type I, Type II and Type IV fluids can be diluted with water. This may be done if, due to weather conditions, there is no requirement for a long conservation time or the higher freezing points are sufficient for the climatic conditions present.

(4)Holdover times

Holdover times are the estimated times that the applied anti-icing fluid will prevent the formation of frost, ice and the accumulation of snow on the protected surfaces of an aircraft. When applying one step de-/anti-icing process, the holdover time is from the start of the de-/anti-icing application and when applying two step de-/anti-icing process, the holdover time is from the start of anti-icing application. The holdover times given are for general information only. The indicated time of protection may be shortened:
- in severe weather
- in high winds and jet blasts
- by the age and condition of the fluid
- by the method of application.

(5)The anti-icing code

It is important that the flight crew get clear and precise information from persons who have carried out any de-/anti-icing procedures. In order to improve the quality of communication between the de-/anti-icing team and the flight crew, it is recommended that an anti-icing code be used. This will enable the flight crew to assess the "Holdover Time". This code must contain the following information:
- Type of fluid
- Percentage of fluid to water (for Type II or Type IV fluids only)
- Time de-/anti-icing application began (preferably local time)
- Complete name of the anti-icing fluid (so called "brand-name") for Type II and Type IV fluids only (optional).

NOTE : The time referred to in the anti-icing codes must be the starting time of the anti-icing procedure.

Two examples of anti-icing codes are given below:

AEA Type II/ 75/ 16.43 local XXXXX

```
                |       |         |       ------------- Complete name of fluid
                |       |         ---------------------- Local Time of start of the
                |       |                                application
                |       |
                |       -------------------------------- % of fluid/water by vol:
                |                                        75% fluid/25% water
                |
                ---------------------------------------- Type of fluid used

          ISO Type I/ 06.30 UTC
                |     |
                |     |
                |     ---------------------------------- Universal coordinated time
                |                                        of start of the application
                |
                ---------------------------------------- Type of fluid used
```

(6)Equipment

(a)Mobile equipment

Truck mounted de-icing/anti-icing equipment must ideally be compatible for the application of Type I, Type II and Type IV fluids.

R De-icing : anti-icing fluids can show degradation (viscosity
R reduced for instance) by excessive mechanical shearing. Therefore,
R only compatible pumps and spraying nozzles recommended by the fluid
R manufacturers must be used.
R
R **REASON** : To be compatible with **AEA** guidelines, the centrifugal pumps
R can be used with Type I fluids.

(b)Static facilities

Purpose-built de-icing/anti-icing facilities, available at some airports, consist of spray nozzles mounted on a gantry. The gantry moves at a predetermined speed over the aircraft or the aircraft moves under the gantry. The rate of fluid application can be computer-controlled, giving consistent and fast fluid application.

(c)Protective clothing

The usual precautions generally taken with chemicals must be applied when using de-icing/anti-icing fluids. This includes wearing of protective clothing, protective goggles and the application of suitable skin ointment on exposed skin.

COLD WEATHER MAINTENANCE - AIRCRAFT PROTECTION (WITH OAT LOWER THAN -40 deg.C (-40 deg.F))

1. General

This topic provides maintenance procedures for aircraft exposed to weather conditions below -40 deg.C (-40 deg.F).

The following procedures supplement the cold weather maintenance recommendations and guidelines given in AMM section 12-31 under the specific ATA subjects.

2. Seasonal Preparation

ITEM	DESIGNATION
(1)Material No. 15-005A	Storage Preservation (Ref. 20-31-00)
(2)Material No. 04-004A	Common Grease (Ref. 20-31-00)
(3)Material No. 04-004	Common Grease (Ref. 20-31-00)
Referenced Procedures	
- 12-31-27, P. Block 1	Cold Weather Maintenance - Flight Controls
- 12-22-32, P. Block 1	Landing Gear - Lubrication
- 12-31-51, P. Block 1	Cold Weather Maintenance - Structure
- 12-31-52, P. Block 1	Cold Weather Maintenance - Doors

B. Procedure

(1)Flight controls

(a)Flaps and slats lubrication must be performed (Ref. 12-31-27, P. Block 1).

NOTE : When a choice of grease types is given, grease (Material No. 04-004) should be used.

(2)Landing gear

(a)Main and nose landing gear wheel axles must be greased with grease (Material No. 04-004A) when temperatures are expected to fall below -40 deg.C (-40 deg.F) (Ref. 12-22-32, P. Block 1).

(3)Water/waste

(a)Servicing panels must be cleaned and checked for leaks. Panel and doors must have a coating of protective compound (Material No. 15-005A) applied to all surfaces.

(4)Structure

(a)All lower fuselage drain valves must be cleaned and checked for correct operation (Ref. 12-31-51, P. Block 1).

(5)Doors

(a)Door winter preparation must be performed (Ref. 12-31-52, P. Block 1).

3. Turnaround Procedure

This procedure provides additional maintenance and aircraft protection recommendations for aircraft turnaroud, when :

- ambient temperature is lower than -40 deg.C (-40 deg.F)
- aircraft is not subjected to cold soak i.e electrical power and air conditioning available.

This procedure should also be followed if aircraft is to stay overnight at an outstation.

A. Equipment and Materials

ITEM	DESIGNATION
(1)98A12003006000	Main Landing Gear Covers
(2)98A12003008000	Engine Intake Covers
(3)RSE1017	Engine Exhaust Covers
(4)RSE1019	Inlet Cowl Overboard Opening Covers
(5)RSE1103	Reverser Duct Covers
(6)	Wheel Chocks
(7)Material No. 04-004A	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 12-22-32, P. Block 1	Landing Gear - Lubrication
- 12-31-21, P. Block 1	Cold Weather Maintenance - Air Conditioning
- 12-31-28, P. Block 201	Cold Weather Maintenance - Fuel
- 12-31-29, P. Block 201	Cold Weather Maintenance - Hydraulic Power
- 12-31-38, P. Block 1	Cold Weather Maintenance - Water/Waste
- 12-31-49, P. Block 1	Cold Weather Maintenance - Auxiliary Power Unit
- 12-31-52, P. Block 1	Cold Weather Maintenance - Doors
- 12-33-21, P. Block 1	Ground Air Pre-conditioning

B. General

(1)Make certain that parking brake is released and wheel chocks are in position.

(2)Engine protection (if engines do not run periodically).

(a)Install front covers P/N(s) 98A12003008000 on engines.

NOTE : It is recommended to install also rear covers P/N RSE1017, RSE1019 and RSE1103 on engines.

(b)It is recommended to install brake covers P/N 98A12003006000 to avoid snow ingress.

(3)Grease

(a)Make certain that door seals and doors are greased. (Ref. 12-31-52, P. Block 1).

(b)Main and nose landing gear wheel axles must be greased with grease (Material No. 04-004A) when temperature is lower than -40 deg.C (-40 deg.F) (Ref. 12-22-32, P. Block 1).

(4)Refueling

(a)Refuel/defuel panel must be heated before refueling process (Ref. 12-31-28, P. Block 201).

(5)Water/waste

(a)If drainage is necessary, drain water and waste systems before opening cargo compartment doors (Ref. 12-31-38, P. Block 1).
NOTE : Service panels must be heated with hot air during draining procedure.

(6)Auxiliary power unit (Ref. 12-31-49, P. Block 1).
(a)If APU is operational, it should be run continuously.
(b)If APU is not run continuously, it should be run for one hour every three hours in order to ensure its availability when aircraft is prepared for departure.
(c)Refer also to steps (7) and (8) if APU is not run continuously.

(7)Electrical power
(a)Electrical power to the aircraft must be maintained continuously. If APU is not running, an electrical supply must be maintained from an external source.

(8)Air conditioning (Ref. 12-31-21, P. Block 1), (Ref. 12-33-21, P. Block 1).
(a)One pack must remain in operation.
- aircraft (APU or engine) or a high pressure ground source of bleed air is required.

NOTE : Electrical power is required to operate pack(s).

(9)Hydraulic power
CAUTION : WAIT 5 MINUTES AFTER SELECTING PTU'S ON BEFORE OPERATING HYDRAULIC POWERED COMPONENTS.
(a)Fluid level (Ref. 12-31-29, P. Block 201).

(10)Flight controls preparation after cold soak
CAUTION : SLATS/FLAPS MUST BE SELECTED NOTCH BY NOTCH.
NOTE : Time interval between the end of flight controls preparation and flight departure must not exceed 2 hours. Otherwise, flight controls preparation must be repeated.
(a)Make certain that hydraulic power is in operation for at least 5 minutes, that pitch trim control levers are selected off and that flight controls computers are operating.
(b)Slowly move flight controls to full deflection for at least 3 minutes, in each axis, in the following order :
- control column : check elevator motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- rudder pedals : check rudder motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- aileron control : check aileron motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- operate rudder trim : check rudder correct operation on ECAM FLT CTL page and on RUD TRIM indicator on panel 408VU
- operate pitch trim control wheel manually : check THS motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU.

(c)Once THS operates normally in manual mode :
- engage pitch trim control levers then operate THS using pitch trim control switches on control wheel : check on FLIGHT CONTROLS section of panel 471VU for absence of illumination of EFCU BITE DISPLAY annunciator.

(d)Move notch by notch flap and slat control lever once from 0° to full and reverse.

(e)Move notch by notch speed brake control lever to full deflection and reverse.

(11)Engines

NOTE : It is recommended that engine oil temperature be maintained above -40 deg.C (-40 deg.F). The minimum oil temperature for starting is -40 deg.C (-40 deg.F).
If oil temperature falls below this temperature, preheating is necessary using hot air. The necessity for preheating can be avoided if engine is started and run periodically in order to keep oil at or above -40 deg.C (-40 deg.F).

(a)Heat-up of the engines.

CAUTION : MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE HOT AIR BLOWER IS NOT MORE THAN 121 DEG.C (250 DEG.F) WHEN APPLIED TO THE ENGINE OR THE NACELLE.

CAUTION : THE ENGINE OIL TEMPERATURE MUST BE CHECKED THROUGH THE FADEC GROUND TEST ON THE RIGHT ECAM DU.

NOTE : The estimated time for heat-up of the engines is approximately 30 minutes. However, this time is for planning purposes only and it must not replace oil temperature requirement of -40 deg.C (-40 deg.F) or warmer.

NOTE : In case of fuel leaks during heat-up of the engines :
- make certain that leaks stop after ground idle power is attained.

1 Temperature reading of the engine oil :
- on ENG section of panel 472VU, place FADEC/ENG1/ENG2 switch in ENG1(ENG2) position
- on ENG section of panel 472VU, place OFF/TEST/BITE DISPLAY switch in TEST position
- read engine oil temperature on FADEC GNRD TEST on R ECAM DU.

NOTE : If oil temperature is lower than -50 deg.C (-58 deg.F), XXX.X is displayed on ECAM DU.
To recover oil temperature indications :
- pre heat engine to raise oil temperature to warmer than -50 deg.C (-58 deg.F).
- place OFF/TEST/BITE DISPLAY switch in OFF position and then in TEST position.

2 Heat engine oil by using a hot air cart blowing through IDG access panels until indicated oil temperature is greater than -40 deg.C (-40 deg.F).

NOTE : It is recommended to blow also hot air through engine exhaust nozzles.
If N1 rotor does not turn freely, it is mandatory to blow also hot air through engine exhaust nozzles.
If hot air is blown simultaneously through exhaust nozzles, rear protective covers of the engines must be removed.

(b)Remove ground equipment and protective covers immediately before engine start.

4. Procedure for Aircraft Left without Air Supply, with Electrical Supply and without Time Limit

Equipment in the avionics compartment and flight compartment will be maintained at a temperature above -15 deg.C (5 deg.F) by their own electrical consumption and electrical heater. All other aircraft zones will cool down.

NOTE : In this procedure, the following equipment must be removed and stored at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F) (we recommend also to remove and store APU ECB) :
- portable fire extinguisher bottles
- megaphone
- emergency radio beacon
- flash lamps
- portable oxygen equipment
- first aid kits
- APU ECB (optional).

A. Equipment and Materials

ITEM	DESIGNATION
(1)98A12003002000	Dummy Door
(2)98A12003003000	Air Evacuation Adaptor
(3)98A12003004000	External Duct Assembly
(4)98A12003005000	Internal Duct Assembly
(5)98A12003006000	Main Landing Gear Covers
(6)98A12003007000	Windshield Insulation
(7)98A12003008000	Engine Intake Covers
(8)RSE1017	Engine Exhaust Covers
(9)RSE1019	Inlet Cowl Overboard Opening Covers
10)RSE1103	Reverser Duct Covers
11)98A10108300000	Adaptor-Heating, APU
12)98A12003010000	Cockpit Electrical Heater
13)	Wheel Chocks
14)Material No. 04-004A	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 12-31-28, P. Block 201	Cold Weather Maintenance - Fuel
- 12-31-29, P. Block 201	Cold Weather Maintenance - Hydraulic Power
- 12-31-38, P. Block 1	Cold Weather Maintenance - Water/Waste
- 12-31-49, P. Block 1	Cold Weather Maintenance - Auxiliary Power Unit
- 12-31-52, P. Block 1	Cold Weather Maintenance - Doors
- 24-41-00, P. Block 301	Energize Aircraft from External Power
- 49-61-11, P. Block 401	Removal/Installation of the Electronic Control Box (59KD)

B. General

(1)Grease

(a)Make certain that door seals and doors are greased. (Ref. 12-31-52, P. Block 1).

(b)Main and nose landing gear wheel axles must be greased with grease (Material No. 04-004A) when temperature is lower than -40 deg.C

(-40 deg.F).
(2)Refueling
(a)Refuel/defuel panel must be heated before refueling process (Ref. 12-31-28, P. Block 201).

C. Procedure
(1)Preparation of aircraft before cold-soak condition
(a)Drain water and waste systems before opening cargo compartment doors (Ref. 12-31.38, P. Block 1).
NOTE : Service panels must be heated with hot air during draining procedure.
(b)Make certain that parking brake is released and wheel chocks are in position.
(c)Install protective covers
1 Install front covers P/N(s) 98A120003008000 on engines.
NOTE : It is recommended to install also rear covers P/N RSE1017, RSE1019 and RSE1103 on engines.
2 It is recommended to install brakes covers P/N 98A12003006000 to avoid snow ingress.
(d)Remove the following portable safety equipment and store at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F) :
- fire extinguisher bottles
- megaphone
- emergency radio beacon
- flash lamps
- portable oxygen equipment
- first aid kits.
(e)Make certain that APU is shut down.
(f)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(g)System configuration :
1 On ELEC PWR panel section of 424VU :
- release GALLEY pushbutton switch (SHED legend on).
2 On VENT panel 438VU :
- release CABIN FANS pushbutton switch (OFF legend on).
3 On HYD PWR panel 427VU :
- release PTU pushbutton switches (ON legends off).
- release ELEC PUMPS pushbutton switch (ON legend off).
4 On WINDOW HEAT section of panel 433VU :
- release L and R PWR pushbutton switches (OFF legends on).
5 On AIR BLEED section of panel 436VU :
- release X FEED mode pushbutton switch (MAN legend on).
6 On ANN LT section of panel 436VU :
- place EMER EXIT LT switch in ARM position.
7 On COMPT TEMP panel 437VU :
- release ISOL VALVE pushbutton switches (OFF legends on).
8 On panel 20VU :
- switch off IRS on ISDU 311FP.
- switch off MSU 1, 2 and 3 on 310FP1, 2 and 3.
9 On panels 412VU and 413VU :
- switch off PFD and ND.

10 On ECAM control panel :
- switch off L and R display units.

11 On cabin forward attendant panel
- release POWER pushbutton switch.

12 On cabin panels :
- switch off all cabin and lavatories lights.

(h)Open, safety and tag the following circuit breakers :

CAUTION : THE AVIONICS COMPARTMENT LIGHTS DO NOT OPERATE WHEN THE C/B 7PN IS OPEN.

PANEL	SERVICE	IDENT.	LOCATION
21VU	AIDS/EXP	54TU	105/E4
21VU	AIDS/PMUX & SENSORS	12TU	105/E5
21VU	RAD ALTM 1	7SA1	107/C5
21VU	RAD ALTM	7SA2	107/C10
22VU	EMER LT/EXIT LT	20WL	205/E27
22VU	EMER LT/EXIT LT	21WL	205/E28
22VU	LAV EMER LIGHT	1WL	205/E26
101VU	110XP BUSBAR AND GALLEYS	11XN	A11
101VU	SEC GALLEY AND 210XP BUSBAR	10XN	A14
101VU	SEC GALLEY AND 211XP BUSBAR	16XN	C5
101VU	216XP BUSBAR	12XN	A5
101VU	CLS AND GRD SERVICE BUSBAR	30XN	A3
106VU	DC NORM BUS 102PP	2PN	A12
106VU	SERVICE BUS 603PP	8PN	A4
106VU	SERVICE BUS 601PP	7PN	A5
131VU	GALLEY & LAV FAN/CTL	10HU	314/E62
131VU	GALLEY & LAV FAN/SUPPLY	11HU	314/E60
131VU	APU/ECB BACK UP/SUPPLY	58KD	317/B52
131VU	APU/ECB BACK UP/CTL	71KD	317/B53
131VU	APU/START	50KA	317/B54
131VU	APU/WARN	2KD	317/B56
131VU	APU/ECB SUPPLY MAIN	1KD	317/B57
131VU	DEMAND TEMP CTL	7HH	313/F56
132VU	APU BOOST SIGNAL	54DM	322/N64
133VU	ENG 1 & 2/START CLT & WARN	1KG	335/R68

(i)It is recommended to remove and store APU ECB (at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F) when aircraft is left parked with outside temperature below -40 deg.C (-40 deg.F). (Ref. 49-61-11, P. Block 401).

NOTE : Failure to remove APU ECB necessitates an ECB warm up procedure before starting APU.

(j)Install tools P/N(s) 98A12003003000, 98A12003004000, 98A12003002000 and 98A12003005000 to recirculate in a closed circuit ventilation air of avionics compartment (Ref. Fig. 201).

(k)Install and switch on electrical heater P/N 98A12003010000 in flight compartment.

(l)Install covers P/N 98A12003007000 on the inside of flight compartment windows (Ref. Fig. 201).

(m)Open access door between flight compartment and avionics compartment and secure it in open position.
(n)Flight compartment door must be closed.
(o)It is recommended to lock toilet doors open.
(2)Recovery of aircraft after cold-soak condition
CAUTION : DO NOT MOVE ANY PART OF CABIN FURNISHINGS UNTIL CABIN IS WARM.
CAUTION : DO NOT SWITCH WINDOW HEAT ON UNTIL REQUIRED IN THE PROCEDURE.
(a)Reset of computers.
1 On ELEC PWR section of panel 424VU :
- release BAT 1, 2 and 3 pushbutton switches (OFF legends on) and EXT PWR pushbutton switch (AVAIL legend on).
- push BAT 1, 2 and 3 pushbutton switches (OFF legends off) and EXT PWR pushbutton switch (ON legend on).
(b)Switch on displays and IRS
1 On panel 20VU :
- place MSU 1, 2 and 3 selector switches in NAV position
- select SYS 1, 2 or 3 position on ISDU.
2 On panels 412VU and 413VU :
- switch on PFD and the ND.
(c)On ECAM control panel :
- switch on L and R display units.
(d)APU starting
1 On ELEC PWR section of panel 424VU :
- release APU GEN pushbutton switch (OFF legend on).
2 On AIR BLEED section of panel 436VU :
- place APU BLEED switch in OFF position.
3 When type 1 oil is used, heating before APU starting is not required but it is recommended.
4 When type 2 oil is used :
- open APU access door (315AL), install APU heating adaptor P/N 98A10108300000 and connect to a hot air ground cart. Heat up APU for at least 30 minutes.
5 Install a hot APU ECB (Ref. 12-31-49, P. Block 1) or energize ECB for 30 mn before starting APU when ECB has been left onboard.
NOTE : To energize APU/ECB, close circuit breakers 58KD, 71KD, 50KA, 2KD, 1KD, 7HH, 54DM and 1KG and place APU MASTER SW in ON position on panel 429VU.
6 Remove APU heating adaptor P/N 98A10108300000 if installed and close APU access door (315AL).
7 Close the following circuit breaker(s) :
58KD, 71KD, 50KA, 2KD, 1KD, 7HH, 54DM, 1KG.
8 Start APU :
- wait for at least 5 minutes for temperature stabilization.
9 On ELEC PWR section of panel 424VU :
- press APU GEN pushbutton switch (OFF legend off).
10 On AIR BLEED section of panel 436VU :
- press X FEED mode pushbutton switch (AUTO) (MAN legend off).
- place APU BLEED switch in ON position.
(e)Start air conditioning packs.
NOTE : It is recommended to start pack 1 (more dedicated to flight compartment) first and pack 2 soon after pack 1 is stabilized

(within 3 minutes).

(f)Remove tools P/N(s) 98A12003003000, 98A12003004000, 98A12003002000 and 98A12003005000.

(g)When aircraft internal temperature indicated on ECAM is more than 24 deg.C (75.2 deg.F) :

1 Close all the circuit breaker(s) : 54TU, 12TU, 7SA1, 7SA2, 20WL, 21WL, 1WL, 2PN, 8PN, 7PN, 11XN, 10XN, 16XN, 12XN, 30XN, 10HU, 11HU.

2 On ELEC PWR section of panel 424VU :
- press GALLEY pushbutton switch (SHED legend off).

3 On VENT panel 438VU :
- press CABIN FANS pushbutton switch (OFF legend off).

4 On COMPT TEMP panel 437VU :
- press ISOL VALVE pushbutton switch(es) (OFF legend(s) off).

5 On WINDOW HEAT section of panel 433VU :
- press L and R PWR pushbutton switches (OFF legends off).

6 On cabin forward attendant panel :
- press POWER pushbutton switch.

(h)Install the following cabin safety equipment :
- fire extinguisher bottles
- megaphone
- emergency radio beacon
- flash lamps
- portable oxygen equipment
- first aid kits.

(i)Hydraulic power

CAUTION : WAIT 5 MINUTES AFTER SELECTING PTU'S ON BEFORE OPERATING HYDRAULIC POWERED COMPONENTS.

1 On HYD PWR panel 427VU :
- press ELEC PUMPS pushbutton switch (ON legend on).

NOTE : If Green hydraulic pressure does not reach nominal values or Green electric pump fails to start after several attempts, refer to 12-31-29, P. Block 201.

2 After 1 minute, on HYD PWR panel 427VU :
- press PTU pushbutton switches (ON legends on).

(j)Flight controls preparation

CAUTION : SLATS/FLAPS MUST BE SELECTED NOTCH BY NOTCH.

NOTE : The time interval between the end of flight controls preparation and flight departure must not exceed 2 hours. Otherwise, flight controls preparation must be repeated.

1 Make certain that hydraulic power is in operation for at least 5 minutes, that pitch trim control levers are selected off and that flight controls computers are operating.

2 Slowly move flight controls to full deflection for at least 3 minutes, in each axis, in the following order :
- control column : check elevator motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- rudder pedals : check rudder motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- aileron control : check aileron motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- operate rudder trim : check rudder correct operation on ECAM FLT CTL

page and on RUD TRIM indicator on panel 408VU
- operate pitch trim control wheel manually : check THS motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU.

3 Once THS operates normally in manual mode :
- engage pitch trim control levers and then operates THS using pitch trim control switches on control wheel : check on FLIGHT CONTROLS section of panel 471VU for absence of illumination of EFCU BITE DISPLAY annunciator.

4 Move notch by notch flap and slat control lever once from 0° to full and reverse.

5 Move notch by notch speed brake control lever to full deflection and reverse.

(k)Proceed to standard aircraft pre-flight preparation.

1 The minimum required heat-up time of the aircraft is :
- 2.5 hours for OAT not lower than -40 deg.C (-40 deg.F)
- 3 hours for OAT not lower than -48 deg.C (-54.4 deg.F)
- 3.5 hours for OAT not lower than -54 deg.C (-65 deg.F).

(l)Heat-up of the engines.

CAUTION : MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE HOT AIR BLOWER IS NOT MORE THAN 121 DEG.C (250 DEG.F) WHEN APPLIED TO THE ENGINE OR THE NACELLE.

CAUTION : THE ENGINE OIL TEMPERATURE MUST BE CHECKED THROUGH THE FADEC GROUND TEST ON THE RIGHT ECAM DU.

NOTE : The estimated time for heat-up of the engines is approximately 30 minutes. However, this time is for planning purposes only and it must not replace the oil temperature requirement of -40 deg.C (-40 deg.F) or warmer.

NOTE : In case of fuel leaks during heat-up of the engines :
- make certain that leaks stop after ground idle power is attained.

1 Temperature reading of the engine oil :
- on ENG section of panel 472VU, place FADEC/ENG1/ENG2 switch in ENG1(ENG2) position
- on ENG section of panel 472VU, place OFF/TEST/BITE DISPLAY switch in TEST position
- read engine oil temperature on FADEC GNRD TEST on R ECAM DU.

NOTE : If oil temperature is lower than -50 deg.C (-58 deg.F), XXX.X is displayed on ECAM DU.
To recover oil temperature indication :
- pre heat engine to raise oil temperature to warmer than -50 deg.C (-58 deg.F).
- place OFF/TEST/BITE DISPLAY switch in OFF position and then in TEST position.

2 Heat engine oil by using a hot air cart blowing through IDG access panels until indicated oil temperature is greater than -40 deg.C (-40 deg.F).

NOTE : It is recommended to blow also hot air through engine exhaust nozzles.
If N1 rotor does not turn freely, it is mandatory to blow also hot air through engine exhaust nozzles.
If hot air is blown simultaneously through exhaust nozzles,

rear protective covers of the engines must be removed.

(m)Remove ground equipment and protective covers immediately before engine start.

5. Procedure for Aircraft Left without Air Supply, without Electrical Supply and without Time Limit

Equipment in avionics compartment and flight compartment will be subjected to a temperature of below -40 deg.C (-40 deg.F).

NOTE : In this procedure, the following equipment must be removed and stored at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F) (we recommend also to remove and store APU ECB) :

- Maintenance Test Panel (MTP) (3CU) (engine panel only)
- Thrust Control Computer (TCC) (301CJ1 and 301CJ2)
- Flight Control Computer (FCC) (301CA1 and 301CA2)
- Flight Augmentation Computer (FAC) (301CC1 and 301CC2)
- cabin emergency lighting batteries (29WL, 110WL)
- Autonomous Standby Power Supply Unit (ASPSU) (70WN) batteries (if installed)
- aircraft batteries (14PE, 15PE and 16PE)
- APU ECB (optional)
- Quick Access Recorder (QAR) (56TU)
- Flight Control Unit (FCU) (303CA)
- Thrust Rating Panel (TRP) (303CJ)
- portable fire extinguisher bottles
- megaphone
- emergency radio beacon
- flash lamps
- portable oxygen equipment
- first aid kits.

ITEM	DESIGNATION
(1)98A12003002000	Dummy Door
(2)98A12003006000	Main Landing Gear Covers
(3)98A12003008000	Engine Intake Covers
(4)RSE1017	Engine Exhaust Covers
(5)RSE1019	Inlet Cowl Overboard Opening Covers
(6)RSE1103	Reverser Duct Covers
(7)98A10108300000	Adaptor-Heating, APU
(8)	Wheel Chocks
(9)Material No. 04-004A	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 12-22-32, P. Block 1	Landing Gear - Lubrication
- 12-31-21, P. Block 1	Cold Weather Maintenance - Air Conditioning
- 12-31-28, P. Block 201	Cold Weather Maintenance - Fuel
- 12-31-29, P. Block 201	Cold Weather Maintenance - Hydraulic Power
- 12-31-38, P. Block 1	Cold Weather Maintenance - Water/Waste
- 12-31-49, P. Block 1	Cold Weather Maintenance - Auxiliary Power Unit
- 12-31-52, P. Block 1	Cold Weather Maintenance - Doors
- 12-33-21, P. Block 1	Ground Air Pre-conditioning
- 22-15-12, P. Block 401	Removal/Installation of the Flight Control Unit
- 22-18-34, P. Block 401	Removal/Installation of the Flight Control Computer
- 22-26-34, P. Block 401	Removal/Installation of the Flight

ITEM	DESIGNATION
	Augmentation Computer
- 22-35-12, P. Block 401	Removal/Installation of the Thrust Rating Panel
- 22-36-34, P. Block 401	Removal/Installation of the Thrust Control Computer
- 22-42-21, P. Block 401	Removal/Installation of the Maintenance Test Panel
- 24-31-11, P. Block 401	Removal/Installation of the A/C Batteies
- 24-41-00, P. Block 301	Energize Aircraft from External Power
- 31-62-65, P. Block 401	Removal/Installation of the Quick Access Recorder
- 33-51-14, P. Block 401	Removal/Installation of the Cabin Emegency Lighting Batteries
- 49-61-11, P. Block 401	Removal/Installation of the Electronic Control Box (59KD)
- 52-73-18, P. Block 401	Removal/Installation of the Power Supply Unit-Autonomous Standby Batteries (if installed)

B. General
(1)Grease
(a)Make certain that door seals and doors are greased.
(Ref. 12-31-52, P. Block 1).
(b)Main and nose landing gear wheel axles must be greased with grease (Material No. 04-004A) when temperature is lower than -40 deg.C (-40 deg.F). (Ref. 12-22-32, P. Block 1).
(2)Refueling
(a)Refuel/defuel panel must be heated before refueling process (Ref. 12-31-28, P. Block 201).

C. Procedure
(1)Preparation of aircraft before cold-soak condition.
(a)Drain water and waste systems (Ref. 12-31.38, P. Block 1).
(b)Make sure that parking brake is released and wheel chocks are in position.
(c)Install protective covers.
1 Install front covers P/N 98A12003008000 on engines.
NOTE : It is recommended to install also rear covers P/N(s) RSE1017, RSE1019 and RSE1103 on engines.
2 It is recommended to install brakes covers P/N 98A12003006000 to avoid snow ingress.
(d)Remove the following equipment and store at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F) :
1 MTP (3CU) (engine panel only) (Ref. 22-42-21, P. Block 401).
2 TCC (301CJ1 and 301CJ2) (Ref. 22-36-34, P. Block 401).
3 FCC (301CA1 and 301CA2) (Ref. 22-18-34, P. Block 401).
4 FAC (301CC1 and 301CC2) (Ref. 22-26-34, P. Block 401).
5 Cabin emergency lighting batteries (29WL, 110WL) (Ref. 33-51-14, P. Block 401).

6 ASPSU (70WN) batteries if installed (Ref. 52-73-18, P. Block 401).
7 QAR (56TU) (Ref. 31-62-65, P. Block 401).
8 FCU (303CA) (Ref. 22-15-12, P. Block 401).
9 TRP (303CJ) (Ref. 22-35-12, P. Block 401).

(e)Remove the following portable equipment and store at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F).
- fire extinguisher bottles
- megaphone
- emergency radio beacon
- flash lamps
- portable oxygen equipment
- first aid kits.

(f)It is recommemded to close isolation valve of crew oxygen cylinder(s).

(g)System configuration :
1 On ELEC PWR section of panel 424VU :
- release GALLEY pushbutton switch (SHED legend on).

2 On VENT panel 438VU :
- release CABIN FANS pushbutton switch (OFF legend on).

3 On HYD PWR panel 427VU :
- release PTU pushbutton switches (ON legends off).
- release ELEC PUMPS pushbutton switch (ON legend off).

4 On WINDOW HEAT section of panel 433VU :
- release L and R PWR pushbutton switches (OFF legends on).

5 On AIR BLEED section of panel 436VU :
- release X FEED mode pushbutton switch (MAN legend on).

6 On ANN LT section of panel 436VU :
- place EMER EXIT LT switch in ARM position.

7 On COMPT TEMP panel 437VU :
- release ISOL VALVE pushbutton switches (OFF legends on).

8 On panel 20VU :
- switch off IRS on ISDU 311FP.
- switch off MSU 1, 2 and 3 on 310FP1, 2 and 3.

9 On panels 412VU and 413VU :
- switch off PFD and ND.

10 On ECAM control panel :
- switch off L and R display units.

(h)Open, safety and tag the following circuit breakers :
CAUTION : THE AVIONICS COMPARTMENT LIGHTS DO NOT OPERATE WHEN THE C/B 7PN IS OPEN.

PANEL	SERVICE	IDENT.	LOCATION
21VU	AIDS/EXP	54TU	105/E4
21VU	AIDS/PMUX & SENSORS	12TU	105/E5
21VU	RAD ALTM 1	7SA1	107/C5
21VU	RAD ALTM 2	7SA2	107/C10
22VU	EMER LT/EXIT LT	20WL	205/E27
22VU	EMER LT/EXIT LT	21WL	205/E28
22VU	LAV EMER LIGHT	1WL	205/E26
101VU	110XP BUSBAR AND GALLEYS	11XN	A11
101VU	SEC GALLEY AND 210XP BUSBAR	10XN	A14
101VU	SEC GALLEY AND 211XP BUSBAR	16XN	C5

PANEL	SERVICE	IDENT.	LOCATION
101VU	216XP BUSBAR	12XN	A5
101VU	CLS AND GRD SERVICE BUSBAR	30XN	A3
106VU	DC NORM BUS 102PP	2PN	A12
106VU	SERVICE BUS 603PP	8PN	A4
106VU	SERVICE BUS 601PP	7PN	A5
131VU	GALLEY & LAV FAN/CTL	10HU	314/E62
131VU	GALLEY & LAV FAN/SUPPLY	11HU	314/E60
132VU	EMER LT/EXIT LT/CHARGER	24WL	324/L75

(i)Shut down APU.
(j)It is recommended to remove and store APU ECB (at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F) when aircraft is left parked with outside temperature below -40 deg.C (-40 deg.F) (Ref. 49-61-11, P. Block 401).
NOTE : Failure to remove APU ECB necessitates an ECB warm up procedure before starting APU.
(k)It is recommended to lock toilet doors open.
(l)On ELEC PWR panel 424VU :
1 Release EXT PWR pushbutton switch (AVAIL legend on).
(m)Disconnect electrical ground power unit from aircraft.
(n)Remove batteries (14PE, 15PE, 16PE) (Ref. 24-31-11, P. Block 401).

(2)Recovery of aircraft after cold-soak condition
CAUTION : DO NOT MOVE ANY PART OF CABIN FURNISHINGS UNTIL CABIN IS WARM.
CAUTION : DO NOT CONNECT EXTERNAL POWER TO THE AIRCRAFT UNTIL AVIONICS COMPARTMENT TEMPERATURE IS MORE THAN -15 DEG.C (5 DEG.F) OR WARMER.
CAUTION : DO NOT SWITCH ON WINDOW HEAT UNTIL REQUIRED IN THIS PROCEDURE.
(a)Installation of ground equipment.
1 Open avionics compartment access door 121BL and install dummy door P/N 98A12003002000.
2 Connect hot air ground cart to dummy door and heat avionics compartment and flight compartment.
Refer to heat-up time table (Ref. Fig. 202)
3 It is recommended to start to heat the inside of the cabin using hot air ground cart (Ref. 12-33-21, P. Block 1).
(b)Install batteries (14PE, 15PE, 16PE) (Ref. 24-31-11, P. Block 401).
(c)Connect electrical ground power unit to aircraft.
(d)APU starting
1 On ELEC PWR section of panel 424VU :
- release APU GEN pushbutton switch (OFF legend on).
2 On AIR BLEED section of panel 436VU :
- place APU BLEED switch in OFF position.
3 When type 1 oil is used, heating before APU starting is not required but it is recommended.
4 When type 2 oil is used :
- open APU access door (315AL), install APU heating adaptor P/N 98A10108300000 and connect to a hot air ground cart. Heat up APU for at least 30 minutes.

5 Install hot APU ECB (Ref. 12-31-49, P. Block 1) or energize ECB for 30 mn before starting APU when ECB has been left onboard.
NOTE : To energize APU ECB, close circuit breakers 58KD, 71KD, 50KA, 2KD, 1KD, 7HH, 54DM and 1KG and place APU MASTER SW in ON position on panel 429VU.
6 Remove APU heating adaptor P/N 98A10108300000 if installed and close APU access door (315AL).
7 Start APU :
8 Wait for at least 5 minutes for temperature stabilization.
9 On ELEC PWR section of panel 424VU :
- press APU GEN pushbutton switch (OFF legend off).
10 On AIR BLEED section of panel 436VU :
- press the X FEED mode pushbutton switch (AUTO) (MAN legend off).
- place APU BLEED switch in ON position.

(e)Start air conditioning packs.
NOTE : It is recommended to start pack 1 (more dedicated to flight compartment) first and pack 2 soon after pack 1 is stabilized (within 3 minutes).

(f)Remove dummy door P/N 98A12003002000 and close avionics compartment access door 121BL.

(g)Open crew oxygen cylinder(s) manual isolation valve if closed.

(h)Install the following equipment :
1 MTP (3CU) (engine panel only) (Ref. 22-42-21, P. Block 401).
2 TCC (301CJ1 and 301CJ2) (Ref. 22-36-34, P. Block 401).
3 FCCs (301CA1 and 301CA2) (Ref. 22-18-34, P. Block 401).
4 FACs (301CC1 and 301CC2) (Ref. 22-26-34, P. Block 401).
5 Cabin emergency lighting batteries (29WL, 110WL) (Ref. 33-51-14, P. Block 401).
6 ASPSU batteries (70WN) if installed (Ref. 52-73-18, P. Block 401).
7 QAR (56TU) (Ref. 31-62-65, P. Block 401).
8 FCU (303CA) (Ref. 22-15-12, P. Block 401).
9 TRP (303CJ) (Ref. 22-35-12, P. Block 401).

(i)When aircraft internal temperature indicated on ECAM is more than 24 deg.C (75.2 deg.F) :
1 Close all circuit breakers : 54TU, 12TU, 7SA1, 7SA2, 20WL, 21WL, 1WL, 2PN, 8PN, 7PN, 11XN, 10XN, 16XN, 12XN, 30XN, 10HU, 11HU, 24WL.
2 On ELEC PWR section of panel 424VU :
- press GALLEY pushbutton switch (SHED legend off).
3 On VENT panel 438VU :
- press CABIN FANS pushbutton switch (OFF legend off).
4 On COMPT TEMP panel 437VU :
- press ISOL VALVE pushbutton switch(es) (OFF legend(s) off).
5 On WINDOW HEAT section of panel 433VU :
- press L and R PWR pushbutton switches (OFF legends off).
6 On cabin forward attendant panel :
- press POWER pushbutton switch.

(j)Hydraulic power
CAUTION : WAIT 5 MINUTES AFTER SELECTING PTU'S ON BEFORE OPERATING HYDRAULIC POWERED COMPONENTS.
1 On HYD PWR panel 427VU :
- press ELEC PUMPS pushbutton switch (ON position on).

NOTE : If Green hydraulic pressure does not reach nominal values or Green electric pump fails to start after several attempts, refer to 12-31-29, P. Block 201.

2 After 1 minute, on HYD PWR panel 427VU :
- press PTU pushbutton switches (ON legends on).

(k)Install the following cabin safety equipment :
- fire extinguisher bottles
- megaphone
- emergency radio beacon
- flash lamps
- portable oxygen equipment
- first aid kits.

(l)Flight controls preparation

CAUTION : SLATS/FLAPS MUST BE SELECTED NOTCH BY NOTCH.

NOTE : The time interval between the end of flight controls preparation and flight departure must not exceed 2 hours. Otherwise, flight controls preparation must be repeated.

1 Make certain that hydraulic power is operative for at least 5 minutes, that pitch trim control levers are selected off and that flight controls computers are operative.

2 Slowly move flight controls to full deflection for at least 3 minutes, in each axis, in the following order :
- control column : check elevator motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- rudder pedals : check rudder motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- aileron control : check aileron motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- operate rudder trim : check rudder correct operation on ECAM FLT CTL page and on RUD TRIM indicator on panel 408VU
- operate pitch trim control wheel manually : check THS motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU.

3 Once THS operates normally in manual mode :
- engage pitch trim control levers and then operate THS using pitch trim control switches on control wheel : check on FLIGHT CONTROLS section of panel 471VU for absence of illumination of EFCU BITE DISPLAY annunciator.

4 Move notch by notch flap and slat control lever once from 0° to full and reverse.

5 Move notch by notch speed brake control lever to full deflection and reverse.

(m)Proceed to standard aircraft pre-flight preparation

1 The minimum required heat-up time of the aircraft is :
- 2.5 hours for OAT not lower than -40 deg.C (-40 deg.F)
- 3 hours for OAT not lower than -48 deg.C (-54.4 deg.F)
- 3.5 hours for OAT not lower than -54 deg.C (-65.2 deg.F).

(n)Heat-up of the engines

CAUTION : MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE HOT AIR BLOWER IS NOT MORE THAN 121 DEG.C (250 DEG.F) WHEN APPLIED TO THE ENGINE OR THE NACELLE.

CAUTION : THE ENGINE OIL TEMPERATURE MUST BE CHECKED THROUGH THE FADEC

GROUND TEST ON THE RIGHT ECAM DU.

NOTE : The estimated time for heat-up of the engines is approximately 30 minutes. However, this time is for planning purposes only and it must not replace the oil temperature requirement of -40 deg.C (-40 deg.F) or warmer.

NOTE : In case of fuel leaks during heat-up of the engines :
- make certain that leaks stop after ground idle power is attained.

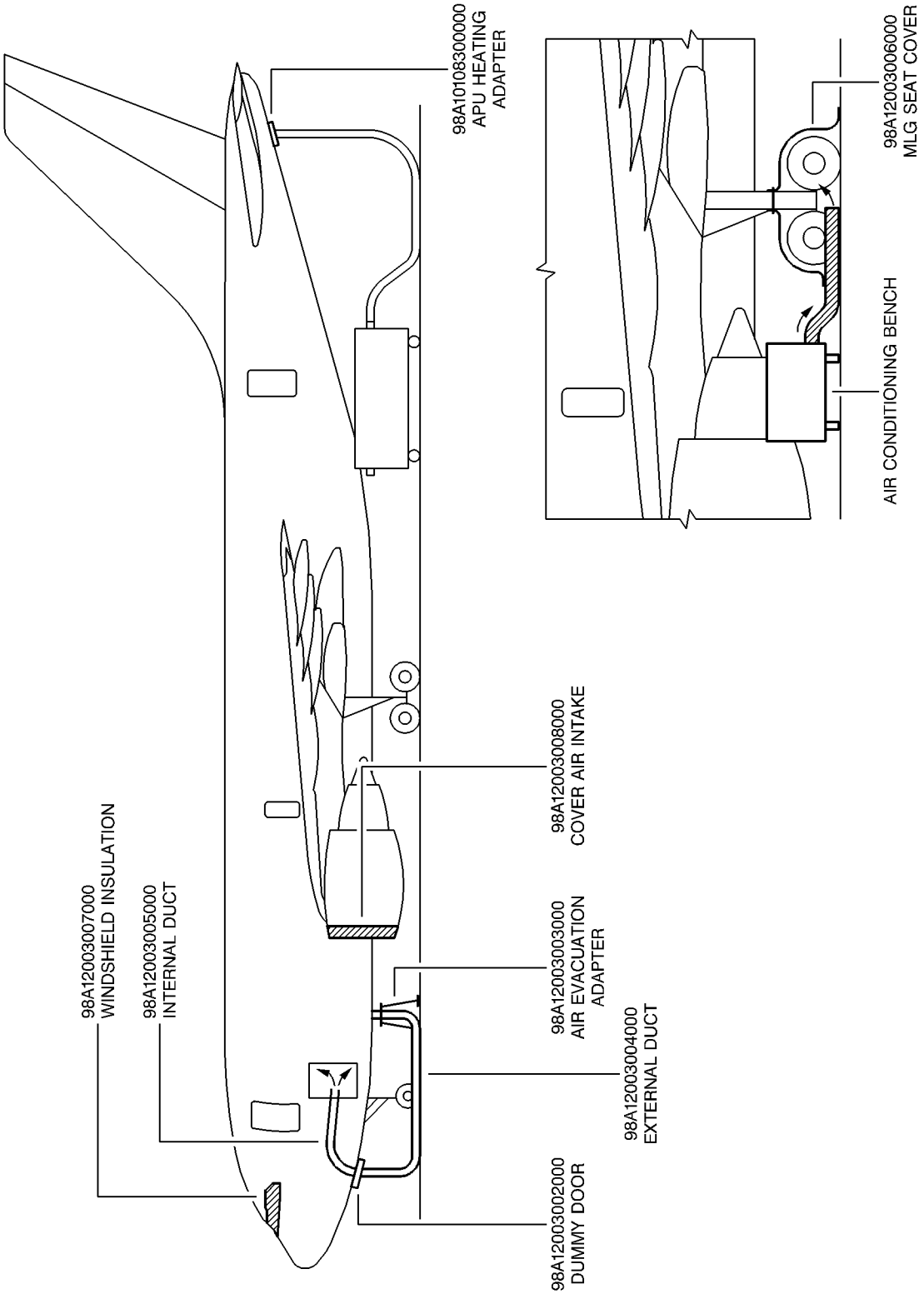
1 Temperature reading of the engine oil :
- place FADEC/ENG1/ENG2 switch in ENG1(ENG2) position on ENG section of panel 472VU.
- place OFF/TEST/BITE DISPLAY switch in TEST POSITION on ENG section of panel 472VU.
- read engine oil temperature on FADEC GRND TEST on R ECAM DU.

NOTE : If oil temperature is lower than -50 deg.C (-58 deg.F), XXX.X is displayed on ECAM DU.
To recover oil temperature indication :
- pre heat engine to raise oil temperature to warmer than -50 deg.C (-58 deg.F).
- place OFF/TEST/BITE DISPLAY switch in OFF position and then in TEST position.

2 Heat engine oil by using a hot air cart blowing through IDG access panels until indicated oil temperature is greater than -40 deg.C (-40 deg.F).

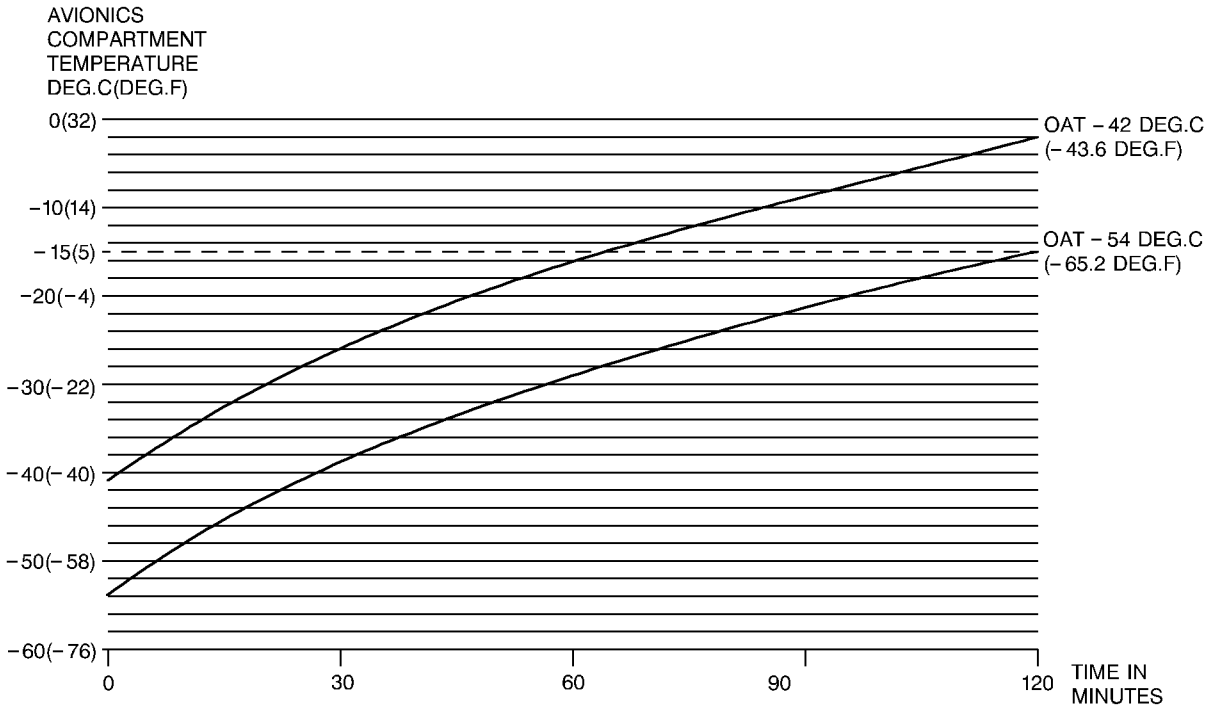
NOTE : It is recommended to blow also hot air through engine exhaust nozzles.
If N1 rotor does not turn freely, it is mandatory to blow also hot air through engine exhaust nozzles.
If hot air is blown simultaneously through exhaust nozzles, rear protective covers of the engines must be removed.

(o)Remove ground equipment and protective covers immediately before engine start.



Installation of Ground Support Equipment
Figure 201

- WITHOUT AIR SUPPLY
- WITHOUT ELECTRICAL SUPPLY
- HEATING BY AN AIR CONDITIONING UNIT CONNECTED TO THE DUMMY DOOR



BM5 12 31 10 2 ABM0 00

Heat-up Time of Avionics Compartment Depending on Temperature
Figure 202

COLD WEATHER MAINTENANCE - AIRCRAFT PROTECTION (WITH OAT LOWER THAN -40 deg.C (-40 deg.F))

1. General

This topic provides maintenance procedures for aircraft exposed to weather conditions below -40 deg.C (-40 deg.F).

The following procedures supplement the cold weather maintenance recommendations and guidelines given in AMM section 12-31 under the specific ATA subjects.

2. Seasonal Preparation

ITEM	DESIGNATION
(1)Material No. 15-005A	Storage Preservation (Ref. 20-31-00)
(2)Material No. 04-004A	Common Grease (Ref. 20-31-00)
(3)Material No. 04-004	Common Grease (Ref. 20-31-00)
Referenced Procedures	
- 12-31-27, P. Block 1	Cold Weather Maintenance - Flight Controls
- 12-22-32, P. Block 1	Landing Gear - Lubrication
- 12-31-51, P. Block 1	Cold Weather Maintenance - Structure
- 12-31-52, P. Block 1	Cold Weather Maintenance - Doors

B. Procedure

(1)Flight controls

(a)Flaps and slats lubrication must be performed (Ref. 12-31-27, P. Block 1).

NOTE : When a choice of grease types is given, grease (Material No. 04-004) should be used.

(2)Landing gear

(a)Main and nose landing gear wheel axles must be greased with grease (Material No. 04-004A) when temperatures are expected to fall below -40 deg.C (-40 deg.F) (Ref. 12-22-32, P. Block 1).

(3)Water/waste

(a)Servicing panels must be cleaned and checked for leaks. Panel and doors must have a coating of protective compound (Material No. 15-005A) applied to all surfaces.

(4)Structure

(a)All lower fuselage drain valves must be cleaned and checked for correct operation (Ref. 12-31-51, P. Block 1).

(5)Doors

(a)Door winter preparation must be performed (Ref. 12-31-52, P. Block 1).

3. Turnaround Procedure

This procedure provides additional maintenance and aircraft protection recommendations for aircraft turnaroud, when :

- ambient temperature is lower than -40 deg.C (-40 deg.F)
- aircraft is not subjected to cold soak i.e electrical power and air conditioning available.

This procedure should also be followed if aircraft is to stay overnight at an outstation.

A. Equipment and Materials

ITEM	DESIGNATION
(1)98A12003006000	Main Landing Gear Covers
(2)98A10003007000	Engine Intake Covers
(3)98A10003009000	Cover, Primary Nozzle
(4)98A10003010000	Plug Anti-ice / Vent
(5)98A10003008000	Reverser Duct Covers
(6)	Wheel Chocks
(7)Material No. 04-004A	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 12-22-32, P. Block 1	Landing Gear - Lubrication
- 12-31-21, P. Block 1	Cold Weather Maintenance - Air Conditioning
- 12-31-28, P. Block 201	Cold Weather Maintenance - Fuel
- 12-31-29, P. Block 201	Cold Weather Maintenance - Hydraulic Power
- 12-31-38, P. Block 1	Cold Weather Maintenance - Water/Waste
- 12-31-49, P. Block 1	Cold Weather Maintenance - Auxiliary Power Unit
- 12-31-52, P. Block 1	Cold Weather Maintenance - Doors
- 12-33-21, P. Block 1	Ground Air Pre-conditioning

B. General

(1)Make certain that parking brake is released and wheel chocks are in position.

(2)Engine protection (if engines do not run periodically).

(a)Install front covers P/N(s) 98A10003007000 on engines.

NOTE : It is recommended to install also other covers P/N 98A10003008000, P/N 98A10003009000 and P/N 98A10003010000 on engines.

(b)It is recommended to install brake covers P/N 98A12003006000 to avoid snow ingress.

(3)Grease

(a)Make certain that door seals and doors are greased. (Ref. 12-31-52, P. Block 1).

(b)Main and nose landing gear wheel axles must be greased with grease (Material No. 04-004A) when temperature is lower than -40 deg.C (-40 deg.F) (Ref. 12-22-32, P. Block 1).

(4)Refueling

(a)Refuel/defuel panel must be heated before refueling process (Ref. 12-31-28, P. Block 201).

(5)Water/waste

(a)If drainage is necessary, drain water and waste systems before opening cargo compartment doors (Ref. 12-31-38, P. Block 1).
NOTE : Service panels must be heated with hot air during draining procedure.

(6)Auxiliary power unit (Ref. 12-31-49, P. Block 1).
(a)If APU is operational, it should be run continuously.
(b)If APU is not run continuously, it should be run for one hour every three hours in order to ensure its availability when aircraft is prepared for departure.
(c)Refer also to steps (7) and (8) if APU is not run continuously.

(7)Electrical power
(a)Electrical power to the aircraft must be maintained continuously. If APU is not running, an electrical supply must be maintained from an external source.

(8)Air conditioning (Ref. 12-31-21, P. Block 1), (Ref. 12-33-21, P. Block 1).
(a)One pack must remain in operation.
- aircraft (APU or engine) or a high pressure ground source of bleed air is required.

NOTE : Electrical power is required to operate pack(s).

(9)Hydraulic power
CAUTION : WAIT 5 MINUTES AFTER SELECTING PTU'S ON BEFORE OPERATING HYDRAULIC POWERED COMPONENTS.
(a)Fluid level (Ref. 12-31-29, P. Block 201).

(10)Flight controls preparation after cold soak
CAUTION : SLATS/FLAPS MUST BE SELECTED NOTCH BY NOTCH.
NOTE : Time interval between the end of flight controls preparation and flight departure must not exceed 2 hours. Otherwise, flight controls preparation must be repeated.
(a)Make certain that hydraulic power is in operation for at least 5 minutes, that pitch trim control levers are selected off and that flight controls computers are operating.
(b)Slowly move flight controls to full deflection for at least 3 minutes, in each axis, in the following order :
- control column : check elevator motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- rudder pedals : check rudder motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- aileron control : check aileron motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- operate rudder trim : check rudder correct operation on ECAM FLT CTL page and on RUD TRIM indicator on panel 408VU
- operate pitch trim control wheel manually : check THS motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU.

(c)Once THS operates normally in manual mode :
- engage pitch trim control levers then operate THS using pitch trim control switches on control wheel : check on FLIGHT CONTROLS section of panel 471VU for absence of illumination of EFCU BITE DISPLAY annunciator.

(d)Move notch by notch flap and slat control lever once from 0° to full and reverse.

(e)Move notch by notch speed brake control lever to full deflection and reverse.

(11)Engines

NOTE : When type 1 oil is used, heating before engine start is not required but is recommended.
When type 2 oil is used, if oil temperature falls below -40 deg.C (-40 deg.F), preheating is necessary using hot air.
The necessity for preheating can be avoided if engine is started and run periodically in order to keep oil at or above -40 deg.C (-40 deg.F).

NOTE : At OAT about -54 deg.C (-65.2 deg.F), after 5 hours oil temperature is equal or below -40 deg.C (-40 deg.F).

(a)Heat-up of the engines.

CAUTION : MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE HOT AIR BLOWER IS NOT MORE THAN 121 DEG.C (250 DEG.F) WHEN APPLIED TO THE ENGINE OR THE NACELLE.

1 Heat engine oil by using a hot air cart blowing through the oil fill door to raise oil temperature in the oil tank to above -40 deg.C (-40 deg.F).

2 Heat engine equipment oil by using a hot air cart blowing through the IDG access panel.

NOTE : When hot air at 70 deg.C (158 deg.F) is used, the estimated time for heat-up of the engines is approximately 30 minutes.

NOTE : In case of fuel leaks during heat-up of the engines :
- make certain that leaks stop after ground idle power is attained.

NOTE : It is recommended to blow also hot air through engine exhaust nozzles.
If N1 rotor does not turn freely, it is mandatory to blow also hot air through engine exhaust nozzles.
If hot air is blown simultaneously through exhaust nozzles, rear protective covers of the engines must be removed.

(b)Remove ground equipment and protective covers immediately before engine start.

4. Procedure for Aircraft Left without Air Supply, with Electrical Supply and without Time Limit

Equipment in the avionics compartment and flight compartment will be maintained at a temperature above -15 deg.C (5 deg.F) by their own electrical consumption and electrical heater. All other aircraft zones will cool down.

NOTE : In this procedure, the following equipment must be removed and stored at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F) (we recommend also to remove and store APU ECB) :

- portable fire extinguisher bottles
- megaphone
- emergency radio beacon
- flash lamps
- portable oxygen equipment
- first aid kits
- APU ECB (optional).

A. Equipment and Materials

ITEM	DESIGNATION
(1)98A12003002000	Dummy Door
(2)98A12003003000	Air Evacuation Adaptor
(3)98A12003004000	External Duct Assembly
(4)98A12003005000	Internal Duct Assembly
(5)98A12003006000	Main Landing Gear Covers
(6)98A12003007000	Windshield Insulation
(7)98A10003007000	Engine Intake Covers
(8)98A10003009000	Cover, Primary Nozzle
(9)98A10003010000	Plug Anti-ice / Vent
10)98A10003008000	Reverser Duct Covers
11)98A10108300000	Adaptor-Heating, APU
12)98A12003010000	Cockpit Electrical Heater
13)	Wheel Chocks
14)Material No. 04-004A	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 12-31-28, P. Block 201	Cold Weather Maintenance - Fuel
- 12-31-29, P. Block 201	Cold Weather Maintenance - Hydraulic Power
- 12-31-38, P. Block 1	Cold Weather Maintenance - Water/Waste
- 12-31-49, P. Block 1	Cold Weather Maintenance - Auxiliary Power Unit
- 12-31-52, P. Block 1	Cold Weather Maintenance - Doors
- 24-41-00, P. Block 301	Energize Aircraft from External Power
- 49-61-11, P. Block 401	Removal/Installation of the Electronic Control Box (59KD)

B. General

(1)Grease

(a)Make certain that door seals and doors are greased. (Ref. 12-31-52, P. Block 1).

(b)Main and nose landing gear wheel axles must be greased with grease (Material No. 04-004A) when temperature is lower than -40 deg.C

(-40 deg.F).
(2)Refueling
(a)Refuel/defuel panel must be heated before refueling process (Ref. 12-31-28, P. Block 201).

C. Procedure
(1)Preparation of aircraft before cold-soak condition
(a)Drain water and waste systems before opening cargo compartment doors (Ref. 12-31.38, P. Block 1).
NOTE : Service panels must be heated with hot air during draining procedure.
(b)Make certain that parking brake is released and wheel chocks are in position.
(c)Install protective covers
1 Install front covers P/N(s) 98A10003007000 on engines.
NOTE : It is recommended to install also other covers P/N 98A10003008000, P/N 98A10003009000 and P/N 98A10003010000 on engines.
2 It is recommended to install brakes covers P/N 98A12003006000 to avoid snow ingress.
(d)Remove the following portable safety equipment and store at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F) :
- fire extinguisher bottles
- megaphone
- emergency radio beacon
- flash lamps
- portable oxygen equipment
- first aid kits.
(e)Make certain that APU is shut down.
(f)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(g)System configuration :
1 On ELEC PWR panel section of 424VU :
- release GALLEY pushbutton switch (SHED legend on).
2 On VENT panel 438VU :
- release CABIN FANS pushbutton switch (OFF legend on).
3 On HYD PWR panel 427VU :
- release PTU pushbutton switches (ON legends off).
- release ELEC PUMPS pushbutton switch (ON legend off).
4 On WINDOW HEAT section of panel 433VU :
- release L and R PWR pushbutton switches (OFF legends on).
5 On AIR BLEED section of panel 436VU :
- release X FEED mode pushbutton switch (MAN legend on).
6 On ANN LT section of panel 436VU :
- place EMER EXIT LT switch in ARM position.
7 On COMPT TEMP panel 437VU :
- release ISOL VALVE pushbutton switches (OFF legends on).
8 On panel 20VU :
- switch off IRS on ISDU 311FP.
- switch off MSU 1, 2 and 3 on 310FP1, 2 and 3.
9 On panels 412VU and 413VU :

- switch off PFD and ND.

10 On ECAM control panel :
- switch off L and R display units.

11 On cabin forward attendant panel
- release POWER pushbutton switch.

12 On cabin panels :
- switch off all cabin and lavatories lights.

(h)Open, safety and tag the following circuit breakers :
CAUTION : THE AVIONICS COMPARTMENT LIGHTS DO NOT OPERATE WHEN THE C/B 7PN IS OPEN.

PANEL	SERVICE	IDENT.	LOCATION
21VU	AIDS/EXP	54TU	105/E4
21VU	AIDS/PMUX & SENSORS	12TU	105/E5
21VU	RAD ALTM 1	7SA1	107/C5
21VU	RAD ALTM	7SA2	107/C10
22VU	EMER LT/EXIT LT	20WL	205/E27
22VU	EMER LT/EXIT LT	21WL	205/E28
22VU	EMER LT/TOILETS	1WL	205/E26
101VU	110XP BUS BAR	11XN	A11
101VU	210XP BUS BAR	10XN	A14
101VU	211XP BUS BAR AND GALLEY	16XN	C5
101VU	216XP GND SERVICE BUS BAR	12XN	A5
101VU	CLS GND SERVICE BUS BAR	30XN	A3
106VU	DC NORM BUS 102PP	2PN	A12
106VU	SERVICE BUS 603PP	8PN	A4
106VU	SERVICE BUS 601PP	7PN	A5
131VU	GALLEY & LAV FAN/CTL	10HU	314/E62
131VU	GALLEY & LAV FAN/SUPPLY	11HU	314/E60
131VU	APU/ECB BACK UP/SUPPLY	58KD	317/B52
131VU	APU/ECB BACK UP/CTL	71KD	317/B53
131VU	APU/START	50KA	317/B54
131VU	APU/WARN	2KD	317/B56
131VU	APU/ECB SUPPLY MAIN	1KD	317/B57
131VU	DEMAND TEMP CTL	7HH	313/F56
132VU	APU BOOST SIGNAL	54DM	322/N64
133VU	ENG 1 & 2/START CLT & WARN	1KG	335/R68

(i)It is recommended to remove and store APU ECB (at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F) when aircraft is left parked with outside temperature below -40 deg.C (-40 deg.F). (Ref. 49-61-11, P. Block 401).
NOTE : Failure to remove APU ECB necessitates an ECB warm up procedure before starting APU.

(j)Install tools P/N(s) 98A12003003000, 98A12003004000, 98A12003002000 and 98A12003005000 to recirculate in a closed circuit ventilation air of avionics compartment (Ref. Fig. 201).

(k)Install and switch on electrical heater P/N 98A12003010000 in flight compartment.

(l)Install covers P/N 98A12003007000 on the inside of flight compartment

windows (Ref. Fig. 201).
(m)Open access door between flight compartment and avionics compartment and secure it in open position.
(n)Flight compartment door must be closed.
(o)It is recommended to lock toilet doors open.
(2)Recovery of aircraft after cold-soak condition
CAUTION : DO NOT MOVE ANY PART OF CABIN FURNISHINGS UNTIL CABIN IS WARM.
CAUTION : DO NOT SWITCH WINDOW HEAT ON UNTIL REQUIRED IN THE PROCEDURE.
(a)Reset of computers.
1 On ELEC PWR section of panel 424VU :
- release BAT 1, 2 and 3 pushbutton switches (OFF legends on) and EXT PWR pushbutton switch (AVAIL legend on).
- push BAT 1, 2 and 3 pushbutton switches (OFF legends off) and EXT PWR pushbutton switch (ON legend on).
(b)Switch on displays and IRS
1 On panel 20VU :
- place MSU 1, 2 and 3 selector switches in NAV position
- select SYS 1, 2 or 3 position on ISDU.
2 On panels 412VU and 413VU :
- switch on PFD and the ND.
(c)On ECAM control panel :
- switch on L and R display units.
(d)APU starting
1 On ELEC PWR section of panel 424VU :
- release APU GEN pushbutton switch (OFF legend on).
2 On AIR BLEED section of panel 436VU :
- place APU BLEED switch in OFF position.
3 When type 1 oil is used, heating before APU starting is not required but it is recommended.
4 When type 2 oil is used :
- open APU access door (315AL), install APU heating adaptor P/N 98A10108300000 and connect to a hot air ground cart. Heat up APU for at least 30 minutes.
5 Install a hot APU ECB (Ref. 12-31-49, P. Block 1) or energize ECB for 30 mn before starting APU when ECB has been left onboard.
NOTE : To energize APU/ECB, close circuit breakers 58KD, 71KD, 50KA, 2KD, 1KD, 7HH, 54DM and 1KG and place APU MASTER SW in ON position on panel 429VU.
6 Remove APU heating adaptor P/N 98A10108300000 if installed and close APU access door (315AL).
7 Close the following circuit breaker(s) :
58KD, 71KD, 50KA, 2KD, 1KD, 7HH, 54DM, 1KG.
8 Start APU :
- wait for at least 5 minutes for temperature stabilization.
9 On ELEC PWR section of panel 424VU :
- press APU GEN pushbutton switch (OFF legend off).
10 On AIR BLEED section of panel 436VU :
- press X FEED mode pushbutton switch (AUTO) (MAN legend off).
- place APU BLEED switch in ON position.
(e)Start air conditioning packs.
NOTE : It is recommended to start pack 1 (more dedicated to flight

compartment) first and pack 2 soon after pack 1 is stabilized (within 3 minutes).

(f)Remove tools P/N(s) 98A12003003000, 98A12003004000, 98A12003002000 and 98A12003005000.

(g)When aircraft internal temperature indicated on ECAM is more than 24 deg.C (75.2 deg.F) :

1 Close all the circuit breaker(s) : 54TU, 12TU, 7SA1, 7SA2, 20WL, 21WL, 1WL, 2PN, 8PN, 7PN, 11XN, 10XN, 16XN, 12XN, 30XN, 10HU, 11HU.

2 On ELEC PWR section of panel 424VU :
- press GALLEY pushbutton switch (SHED legend off).

3 On VENT panel 438VU :
- press CABIN FANS pushbutton switch (OFF legend off).

4 On COMPT TEMP panel 437VU :
- press ISOL VALVE pushbutton switch(es) (OFF legend(s) off).

5 On WINDOW HEAT section of panel 433VU :
- press L and R PWR pushbutton switches (OFF legends off).

6 On cabin forward attendant panel :
- press POWER pushbutton switch.

(h)Install the following cabin safety equipment :
- fire extinguisher bottles
- megaphone
- emergency radio beacon
- flash lamps
- portable oxygen equipment
- first aid kits.

(i)Hydraulic power

CAUTION : WAIT 5 MINUTES AFTER SELECTING PTU'S ON BEFORE OPERATING HYDRAULIC POWERED COMPONENTS.

1 On HYD PWR panel 427VU :
- press ELEC PUMPS pushbutton switch (ON legend on).

NOTE : If Green hydraulic pressure does not reach nominal values or Green electric pump fails to start after several attempts, refer to 12-31-29, P. Block 201.

2 After 1 minute, on HYD PWR panel 427VU :
- press PTU pushbutton switches (ON legends on).

(j)Flight controls preparation

CAUTION : SLATS/FLAPS MUST BE SELECTED NOTCH BY NOTCH.

NOTE : The time interval between the end of flight controls preparation and flight departure must not exceed 2 hours. Otherwise, flight controls preparation must be repeated.

1 Make certain that hydraulic power is in operation for at least 5 minutes, that pitch trim control levers are selected off and that flight controls computers are operating.

2 Slowly move flight controls to full deflection for at least 3 minutes, in each axis, in the following order :
- control column : check elevator motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- rudder pedals : check rudder motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- aileron control : check aileron motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU

- operate rudder trim : check rudder correct operation on ECAM FLT CTL page and on RUD TRIM indicator on panel 408VU
- operate pitch trim control wheel manually : check THS motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU.

3 Once THS operates normally in manual mode :
- engage pitch trim control levers and then operates THS using pitch trim control switches on control wheel : check on FLIGHT CONTROLS section of panel 471VU for absence of illumination of EFCU BITE DISPLAY annunciator.

4 Move notch by notch flap and slat control lever once from 0° to full and reverse.

5 Move notch by notch speed brake control lever to full deflection and reverse.

(k)Proceed to standard aircraft pre-flight preparation.

1 The minimum required heat-up time of the aircraft is :
- 2.5 hours for OAT not lower than -40 deg.C (-40 deg.F)
- 3 hours for OAT not lower than -48 deg.C (-54.4 deg.F)
- 3.5 hours for OAT not lower than -54 deg.C (-65 deg.F).

(l)Heat-up of the engines.

NOTE : When type 1 oil is used, heating before engine start is not required but is recommended.
When type 2 oil is used, if oil temperature falls below -40 deg.C (-40 deg.F), preheating is necessary using hot air.

NOTE : At OAT about -54 deg.C (-65.2 deg.F), after 5 hours oil temperature is equal or below -40 deg.C (-40 deg.F).

CAUTION : MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE HOT AIR BLOWER IS NOT MORE THAN 121 DEG.C (250 DEG.F) WHEN APPLIED TO THE ENGINE OR THE NACELLE.

1 Heat engine oil by using a hot air cart blowing through the oil fill door to raise oil temperature in the oil tank to above -40 deg.C (-40 deg.F).

2 Heat engine equipment oil by using a hot air cart blowing through the IDG access panel.

NOTE : When hot air at 70 deg.C (158 deg.F) is used, the estimated time for heat-up of the engines is approximately 30 minutes.

NOTE : In case of fuel leaks during heat-up of the engines :
- make certain that leaks stop after ground idle power is attained.

NOTE : It is recommended to blow also hot air through engine exhaust nozzles.
If N1 rotor does not turn freely, it is mandatory to blow also hot air through engine exhaust nozzles.
If hot air is blown simultaneously through exhaust nozzles, rear protective covers of the engines must be removed.

(m)Remove ground equipment and protective covers immediately before engine start.

5. Procedure for Aircraft Left without Air Supply, without Electrical Supply and without Time Limit

Equipment in avionics compartment and flight compartment will be subjected to a temperature of below -40 deg.C (-40 deg.F).

NOTE : In this procedure, the following equipment must be removed and stored at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F) (we recommend also to remove and store APU ECB) :

- Maintenance Test Panel (MTP) (3CU) (engine panel only)
- Thrust Control Computer (TCC) (301CJ1 and 301CJ2)
- Flight Control Computer (FCC) (301CA1 and 301CA2)
- Flight Augmentation Computer (FAC) (301CC1 and 301CC2)
- cabin emergency lighting batteries (29WL, 110WL)
- Autonomous Standby Power Supply Unit (ASPSU) (70WN) batteries (if installed)
- aircraft batteries (14PE, 15PE and 16PE)
- APU ECB (optional)
- Quick Access Recorder (QAR) (56TU)
- Flight Control Unit (FCU) (303CA)
- Thrust Rating Panel (TRP) (303CJ)
- portable fire extinguisher bottles
- megaphone
- emergency radio beacon
- flash lamps
- portable oxygen equipment
- first aid kits.

ITEM	DESIGNATION
(1)98A12003002000	Dummy Door
(2)98A12003006000	Main Landing Gear Covers
(3)98A10003007000	Engine Intake Covers
(4)98A10003009000	Cover, Primary Nozzle
(5)98A10003010000	Plug Anti-ice / Vent
(6)98A10003008000	Reverser Duct Covers
(7)98A10108300000	Adaptor-Heating, APU
(8)	Wheel Chocks
(9)Material No. 04-004A	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 12-22-32, P. Block 1	Landing Gear - Lubrication
- 12-31-21, P. Block 1	Cold Weather Maintenance - Air Conditioning
- 12-31-28, P. Block 201	Cold Weather Maintenance - Fuel
- 12-31-29, P. Block 201	Cold Weather Maintenance - Hydraulic Power
- 12-31-38, P. Block 1	Cold Weather Maintenance - Water/Waste
- 12-31-49, P. Block 1	Cold Weather Maintenance - Auxiliary Power Unit
- 12-31-52, P. Block 1	Cold Weather Maintenance - Doors
- 12-33-21, P. Block 1	Ground Air Pre-conditioning
- 22-15-12, P. Block 401	Removal/Installation of the Flight Control Unit
- 22-18-34, P. Block 401	Removal/Installation of the Flight Control Computer
- 22-26-34, P. Block 401	Removal/Installation of the Flight

ITEM	DESIGNATION
	Augmentation Computer
- 22-35-12, P. Block 401	Removal/Installation of the Thrust Rating Panel
- 22-36-34, P. Block 401	Removal/Installation of the Thrust Control Computer
- 22-42-21, P. Block 401	Removal/Installation of the Maintenance Test Panel
- 24-31-11, P. Block 401	Removal/Installation of the A/C Batteries
- 24-41-00, P. Block 301	Energize Aircraft from External Power
- 31-62-65, P. Block 401	Removal/Installation of the Quick Access Recorder
- 33-51-14, P. Block 401	Removal/Installation of the Cabin Emegency Lighting Batteries
- 49-61-11, P. Block 401	Removal/Installation of the Electronic Control Box (59KD)
- 52-73-18, P. Block 401	Removal/Installation of the Power Supply Unit-Autonomous Standby Batteries (if installed)

B. General
(1)Grease
(a)Make certain that door seals and doors are greased.
(Ref. 12-31-52, P. Block 1).
(b)Main and nose landing gear wheel axles must be greased with grease (Material No. 04-004A) when temperature is lower than -40 deg.C (-40 deg.F). (Ref. 12-22-32, P. Block 1).
(2)Refueling
(a)Refuel/defuel panel must be heated before refueling process (Ref. 12-31-28, P. Block 201).

C. Procedure
(1)Preparation of aircraft before cold-soak condition.
(a)Drain water and waste systems (Ref. 12-31.38, P. Block 1).
(b)Make sure that parking brake is released and wheel chocks are in position.
(c)Install protective covers.
1 Install front covers P/N 98A10003007000 on engines.
NOTE : It is recommended to install also other covers P/N 98A10003008000, P/N 98A10003009000 and P/N 98A10003010000 on engines.
2 It is recommended to install brakes covers P/N 98A12003006000 to avoid snow ingress.
(d)Remove the following equipment and store at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F) :
1 MTP (3CU) (engine panel only) (Ref. 22-42-21, P. Block 401).
2 TCC (301CJ1 and 301CJ2) (Ref. 22-36-34, P. Block 401).
3 FCC (301CA1 and 301CA2) (Ref. 22-18-34, P. Block 401).
4 FAC (301CC1 and 301CC2) (Ref. 22-26-34, P. Block 401).
5 Cabin emergency lighting batteries (29WL, 110WL) (Ref. 33-51-14,

P. Block 401).
6 ASPSU (70WN) batteries if installed (Ref. 52-73-18, P. Block 401).
7 QAR (56TU) (Ref. 31-62-65, P. Block 401).
8 FCU (303CA) (Ref. 22-15-12, P. Block 401).
9 TRP (303CJ) (Ref. 22-35-12, P. Block 401).

(e)Remove the following portable equipment and store at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F).
- fire extinguisher bottles
- megaphone
- emergency radio beacon
- flash lamps
- portable oxygen equipment
- first aid kits.

(f)It is recommemded to close isolation valve of crew oxygen cylinder(s).

(g)System configuration :
1 On ELEC PWR section of panel 424VU :
- release GALLEY pushbutton switch (SHED legend on).
2 On VENT panel 438VU :
- release CABIN FANS pushbutton switch (OFF legend on).
3 On HYD PWR panel 427VU :
- release PTU pushbutton switches (ON legends off).
- release ELEC PUMPS pushbutton switch (ON legend off).
4 On WINDOW HEAT section of panel 433VU :
- release L and R PWR pushbutton switches (OFF legends on).
5 On AIR BLEED section of panel 436VU :
- release X FEED mode pushbutton switch (MAN legend on).
6 On ANN LT section of panel 436VU :
- place EMER EXIT LT switch in ARM position.
7 On COMPT TEMP panel 437VU :
- release ISOL VALVE pushbutton switches (OFF legends on).
8 On panel 20VU :
- switch off IRS on ISDU 311FP.
- switch off MSU 1, 2 and 3 on 310FP1, 2 and 3.
9 On panels 412VU and 413VU :
- switch off PFD and ND.
10 On ECAM control panel :
- switch off L and R display units.

(h)Open, safety and tag the following circuit breakers :
CAUTION : THE AVIONICS COMPARTMENT LIGHTS DO NOT OPERATE WHEN THE C/B 7PN IS OPEN.

PANEL	SERVICE	IDENT.	LOCATION
21VU	AIDS/EXP	54TU	105/E4
21VU	AIDS/PMUX & SENSORS	12TU	105/E5
21VU	RAD ALTM 1	7SA1	107/C5
21VU	RAD ALTM 2	7SA2	107/C10
22VU	EMER LT/EXIT LT	20WL	205/E27
22VU	EMER LT/EXIT LT	21WL	205/E28
22VU	EMER LT/TOILETS	1WL	205/E26
101VU	110XP BUS BAR	11XN	A11
101VU	210XP BUS BAR	10XN	A14

PANEL	SERVICE	IDENT.	LOCATION
101VU	211XP BUS BAR AND GALLEY	16XN	C5
101VU	216XP GND SERVICE BUS BAR	12XN	A5
101VU	CLS GND SERVICE BUS BAR	30XN	A3
106VU	DC NORM BUS 102PP	2PN	A12
106VU	SERVICE BUS 603PP	8PN	A4
106VU	SERVICE BUS 601PP	7PN	A5
131VU	GALLEY & LAV FAN/CTL	10HU	314/E62
131VU	GALLEY & LAV FAN/SUPPLY	11HU	314/E60
132VU	EMER LT/EXIT LT/CHARGER	24WL	324/L75

(i)Shut down APU.
(j)It is recommended to remove and store APU ECB (at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F) when aircraft is left parked with outside temperature below -40 deg.C (-40 deg.F) (Ref. 49-61-11, P. Block 401).
NOTE : Failure to remove APU ECB necessitates an ECB warm up procedure before starting APU.
(k)It is recommended to lock toilet doors open.
(l)On ELEC PWR panel 424VU :
1 Release EXT PWR pushbutton switch (AVAIL legend on).
(m)Disconnect electrical ground power unit from aircraft.
(n)Remove batteries (14PE, 15PE, 16PE) (Ref. 24-31-11, P. Block 401).

(2)Recovery of aircraft after cold-soak condition
CAUTION : DO NOT MOVE ANY PART OF CABIN FURNISHINGS UNTIL CABIN IS WARM.
CAUTION : DO NOT CONNECT EXTERNAL POWER TO THE AIRCRAFT UNTIL AVIONICS COMPARTMENT TEMPERATURE IS MORE THAN -15 DEG.C (5 DEG.F) OR WARMER.
CAUTION : DO NOT SWITCH ON WINDOW HEAT UNTIL REQUIRED IN THIS PROCEDURE.
(a)Installation of ground equipment.
1 Open avionics compartment access door 121BL and install dummy door P/N 98A12003002000.
2 Connect hot air ground cart to dummy door and heat avionics compartment and flight compartment.
Refer to heat-up time table (Ref. Fig. 202)
3 It is recommended to start to heat the inside of the cabin using hot air ground cart (Ref. 12-33-21, P. Block 1).
(b)Install batteries (14PE, 15PE, 16PE) (Ref. 24-31-11, P. Block 401).
(c)Connect electrical ground power unit to aircraft.
(d)APU starting
1 On ELEC PWR section of panel 424VU :
- release APU GEN pushbutton switch (OFF legend on).
2 On AIR BLEED section of panel 436VU :
- place APU BLEED switch in OFF position.
3 When type 1 oil is used, heating before APU starting is not required but it is recommended.
4 When type 2 oil is used :
- open APU access door (315AL), install APU heating adaptor P/N 98A10108300000 and connect to a hot air ground cart. Heat up APU

for at least 30 minutes.

5 Install hot APU ECB (Ref. 12-31-49, P. Block 1) or energize ECB for 30 mn before starting APU when ECB has been left onboard.
NOTE : To energize APU ECB, close circuit breakers 58KD, 71KD, 50KA, 2KD, 1KD, 7HH, 54DM and 1KG and place APU MASTER SW in ON position on panel 429VU.

6 Remove APU heating adaptor P/N 98A10108300000 if installed and close APU access door (315AL).

7 Start APU :

8 Wait for at least 5 minutes for temperature stabilization.

9 On ELEC PWR section of panel 424VU :
- press APU GEN pushbutton switch (OFF legend off).

10 On AIR BLEED section of panel 436VU :
- press the X FEED mode pushbutton switch (AUTO) (MAN legend off).
- place APU BLEED switch in ON position.

(e)Start air conditioning packs.
NOTE : It is recommended to start pack 1 (more dedicated to flight compartment) first and pack 2 soon after pack 1 is stabilized (within 3 minutes).

(f)Remove dummy door P/N 98A12003002000 and close avionics compartment access door 121BL.

(g)Open crew oxygen cylinder(s) manual isolation valve if closed.

(h)Install the following equipment :

1 MTP (3CU) (engine panel only) (Ref. 22-42-21, P. Block 401).

2 TCC (301CJ1 and 301CJ2) (Ref. 22-36-34, P. Block 401).

3 FCCs (301CA1 and 301CA2) (Ref. 22-18-34, P. Block 401).

4 FACs (301CC1 and 301CC2) (Ref. 22-26-34, P. Block 401).

5 Cabin emergency lighting batteries (29WL, 110WL) (Ref. 33-51-14, P. Block 401).

6 ASPSU batteries (70WN) if installed (Ref. 52-73-18, P. Block 401).

7 QAR (56TU) (Ref. 31-62-65, P. Block 401).

8 FCU (303CA) (Ref. 22-15-12, P. Block 401).

9 TRP (303CJ) (Ref. 22-35-12, P. Block 401).

(i)When aircraft internal temperature indicated on ECAM is more than 24 deg.C (75.2 deg.F) :

1 Close all circuit breakers : 54TU, 12TU, 7SA1, 7SA2, 20WL, 21WL, 1WL, 2PN, 8PN, 7PN, 11XN, 10XN, 16XN, 12XN, 30XN, 10HU, 11HU, 24WL.

2 On ELEC PWR section of panel 424VU :
- press GALLEY pushbutton switch (SHED legend off).

3 On VENT panel 438VU :
- press CABIN FANS pushbutton switch (OFF legend off).

4 On COMPT TEMP panel 437VU :
- press ISOL VALVE pushbutton switch(es) (OFF legend(s) off).

5 On WINDOW HEAT section of panel 433VU :
- press L and R PWR pushbutton switches (OFF legends off).

6 On cabin forward attendant panel :
- press POWER pushbutton switch.

(j)Hydraulic power
CAUTION : WAIT 5 MINUTES AFTER SELECTING PTU'S ON BEFORE OPERATING HYDRAULIC POWERED COMPONENTS.

1 On HYD PWR panel 427VU :

- press ELEC PUMPS pushbutton switch (ON position on).

NOTE : If Green hydraulic pressure does not reach nominal values or Green electric pump fails to start after several attempts, refer to 12-31-29, P. Block 201.

2 After 1 minute, on HYD PWR panel 427VU :
- press PTU pushbutton switches (ON legends on).

(k)Install the following cabin safety equipment :
- fire extinguisher bottles
- megaphone
- emergency radio beacon
- flash lamps
- portable oxygen equipment
- first aid kits.

(l)Flight controls preparation

CAUTION : SLATS/FLAPS MUST BE SELECTED NOTCH BY NOTCH.

NOTE : The time interval between the end of flight controls preparation and flight departure must not exceed 2 hours. Otherwise, flight controls preparation must be repeated.

1 Make certain that hydraulic power is operative for at least 5 minutes, that pitch trim control levers are selected off and that flight controls computers are operative.

2 Slowly move flight controls to full deflection for at least 3 minutes, in each axis, in the following order :
- control column : check elevator motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- rudder pedals : check rudder motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- aileron control : check aileron motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU
- operate rudder trim : check rudder correct operation on ECAM FLT CTL page and on RUD TRIM indicator on panel 408VU
- operate pitch trim control wheel manually : check THS motion on ECAM FLT CTL page and absence of jamming on overhead panel 428VU.

3 Once THS operates normally in manual mode :
- engage pitch trim control levers and then operate THS using pitch trim control switches on control wheel : check on FLIGHT CONTROLS section of panel 471VU for absence of illumination of EFCU BITE DISPLAY annunciator.

4 Move notch by notch flap and slat control lever once from 0° to full and reverse.

5 Move notch by notch speed brake control lever to full deflection and reverse.

(m)Proceed to standard aircraft pre-flight preparation

1 The minimum required heat-up time of the aircraft is :
- 2.5 hours for OAT not lower than -40 deg.C (-40 deg.F)
- 3 hours for OAT not lower than -48 deg.C (-54.4 deg.F)
- 3.5 hours for OAT not lower than -54 deg.C (-65.2 deg.F).

(n)Heat-up of the engines

NOTE : When type 1 oil is used, heating before engine start is not required but is recommended.
When type 2 oil is used, if oil temperature falls below

-40 deg.C (-40 deg.F), preheating is necessary using hot air.

NOTE : At OAT about -54 deg.C (-65.2 deg.F), after 5 hours oil temperature is equal or below -40 deg.C (-40 deg.F).

CAUTION : MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE HOT AIR BLOWER IS NOT MORE THAN 121 DEG.C (250 DEG.F) WHEN APPLIED TO THE ENGINE OR THE NACELLE.

1 Heat engine oil by using a hot air cart blowing through the oil fill door to raise oil temperature in the oil tank to above -40 deg.C (-40 deg.F).

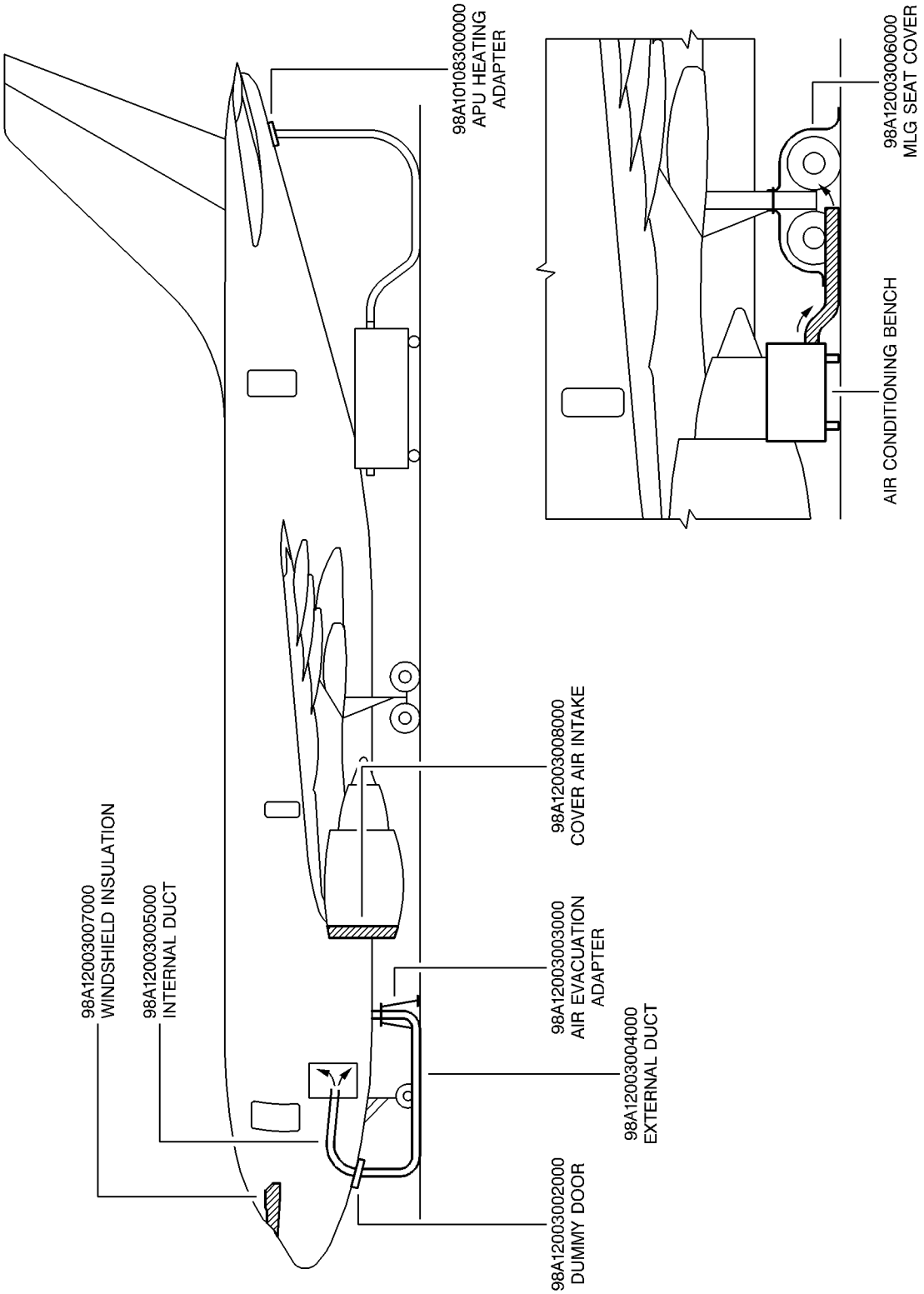
2 Heat engine equipment oil by using a hot air cart blowing through the IDG access panel.

NOTE : When hot air at 70 deg.C (158 deg.F) is used, the estimated time for heat-up of the engines is approximately 30 minutes.

NOTE : In case of fuel leaks during heat-up of the engines :
- make certain that leaks stop after ground idle power is attained.

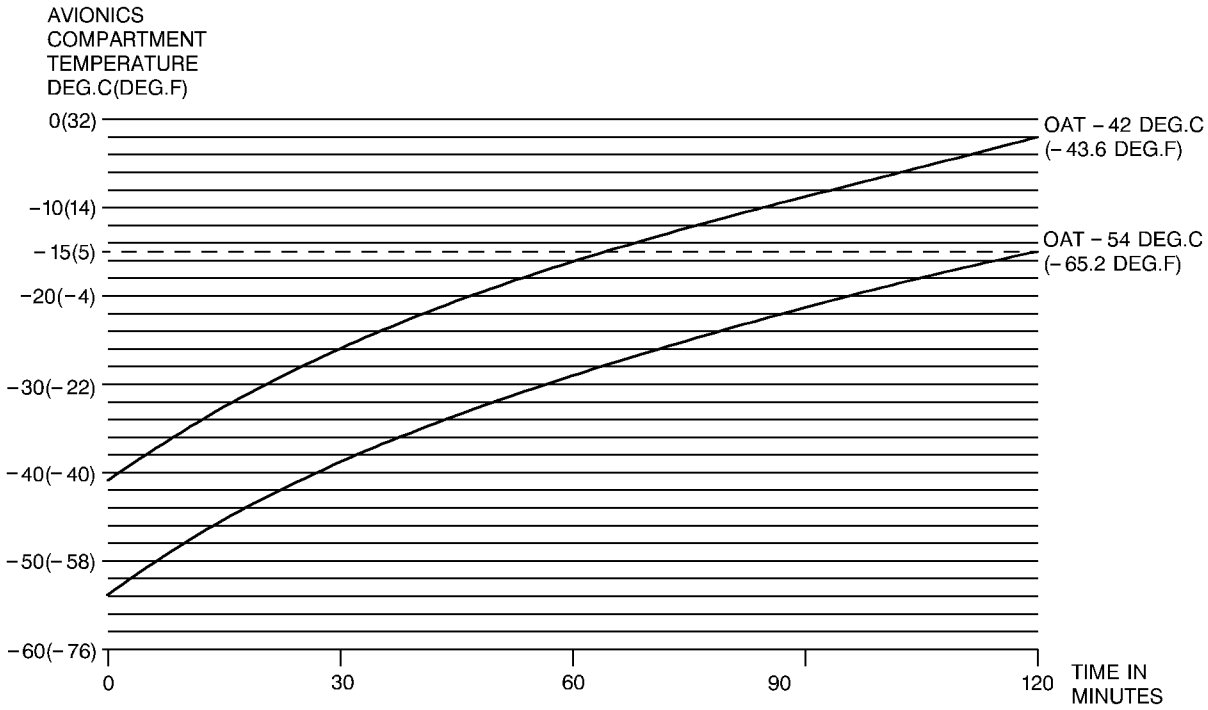
NOTE : It is recommended to blow also hot air through engine exhaust nozzles.
If N1 rotor does not turn freely, it is mandatory to blow also hot air through engine exhaust nozzles.
If hot air is blown simultaneously through exhaust nozzles, rear protective covers of the engines must be removed.

(o)Remove ground equipment and protective covers immediately before engine start.



Installation of Ground Support Equipment
Figure 201

- WITHOUT AIR SUPPLY
- WITHOUT ELECTRICAL SUPPLY
- HEATING BY AN AIR CONDITIONING UNIT CONNECTED TO THE DUMMY DOOR



BM5 12 31 10 2 ABM0 00

Heat-up Time of Avionics Compartment Depending on Temperature
Figure 202

COLD WEATHER MAINTENANCE - ANTI-ICING PROTECTION

1. General

R NOTE : The anti-icing procedure and all the data related to the
R fluids are described in the Association of European Airlines (AEA)
R recommendations:
R Recommendations for anti-icing of aircraft on ground is
R available on the website www.aea.be.

NOTE : The operators must use the procedures applicable to their individual operating methods and requirements.

NOTE : The data given in the tables in this procedure are guidelines only. The user can use these guidelines and his experience and knowledge of the local weather conditions to help him make the decision.
It is the responsibility of the user to make the decision about the applicable methods of protection.
The time of protection will be shorter in very bad weather conditions. High wind speeds and jet blast can cause damage to the protective film. If these conditions occur, the time of protection will be much shorter.
The time of protection can also be much shorter if the wing temperature is lower than the OAT.
Because conditions are not always the same, a pre-take-off inspection is necessary when you use the times given in the tables.

The procedures prevent the formation of ice in some zones (wings, vertical stabilizer, horizontal stabilizer, rudder) and make the removal of snow from the aircraft easier.

WARNING : DO NOT APPLY ANTI-ICING FLUID IN:
- THE AIR INTAKES AND EXHAUST OF THE ENGINES OR APU
- THE AIR OUTLET OF THE OUTFLOW VALVE
- ALL OTHER AIR INTAKES OR OUTLETS.

CAUTION : DO NOT POINT HIGH-PRESSURE JETS:
- AT EQUIPMENT SUCH AS GEAR BOX SEALS, STEADY BEARINGS, ROTARY ACTUATORS AND UNIVERSAL JOINTS,
- AT ELECTRICAL COMPONENTS SUCH AS HARNESSES, PROXIMITY SENSORS AND CONNECTORS.

THE IMPACT PRESSURE OF THE JETS MUST NOT BE MORE THAN 5 PSI (0.35 bar). FOR FAIRINGS, THE IMPACT PRESSURE OF THE JETS MUST NOT BE MORE THAN 1.5 PSI (0.1 bar).
HIGH-PRESSURE JETS CAN PUSH LIQUIDS INTO BEARINGS, JOINTS, BRAKES, ELECTRICAL CONNECTORS AND OTHER SEALED COMPONENTS. LIQUIDS THAT GET INTO THESE AREAS CAN CAUSE CORROSION, FREEZE DURING AIRCRAFT FLIGHT, REMOVE NECESSARY LUBRICANTS OR START INCORRECT ELECTRICAL FUNCTIONS.

CAUTION : DO NOT USE JET EXHAUST TO REMOVE SNOW OR ICE FROM THE AIRFRAME. THE HIGH PRESSURE AND HIGH TEMPERATURE OF JET EXHAUST CAN CAUSE DAMAGE TO THE AIRCRAFT.

CAUTION : DURING THE DE-ICING AND WASHING PROCEDURES, MAKE SURE THAT THE HOT WATER OR HOT WATER/FLUID MIXTURES DO NOT CAUSE THE TEMPERATURE OF THE AIRCRAFT SKIN TO INCREASE TO MORE THAN +70°C.

2. Equipment and Materials

ITEM	DESIGNATION
R (1)	Mobile Equipment for Aircraft De-Icing
Referenced Procedure - 12-33-21, P. Block 1	Ground Air Pre-Conditioning

3. Job Set-Up

A. Recommendations
(1)An aircraft that is ready for flight must not have ice, snow, slush or frost adhering to its critical flight surfaces (wings, vertical and horizontal stabilizers, rudder).
(2)A contamination check of the aircraft must cover all parts of the aircraft. You must do this visual inspection from a position which gives a clear view of all surfaces. Because accumulations of clear ice are sometimes not easily visible, it is recommended that critical surfaces (wings, vertical and horizontal stabilizers, rudder) are inspected with your hands.
(3)Weather conditions determine when the aircraft de-/anti-icing must be carried out.
(4)During checks on the ground, electrical or mechanical ice-detectors must not replace physical checks.
(5)If the aircraft arrives at the gate with the flaps/slats in a position other than fully retracted, you must inspect those flaps/slats, and if necessary de-ice before retraction.
(6)Application limits:
- do not perform a new application of anti-icing fluid directly on top of an existing film.
If it is necessary to re-protect an anti-iced aircraft before its next flight, the aircraft must first be de-iced with a hot fluid mix before any new application of anti-icing fluid.

R

4. Procedure

A. Put the mobile equipment in position.
NOTE : For use on the ramp, the mobile equipment has a storage tank for the anti-icing fluid. Do not mix other fluids with the anti-icing fluid. Use the fluid at the concentration recommended for the temperature to get correct protection.

B. Make sure that the APU bleed and aircraft engine bleeds are stopped.

C. Do the pre-conditioning of the aircraft (Ref. 12-33-21, P. Block 1).

D. Make sure that all the doors and sliding windows are closed.

E. Make sure that the safety zone of the aircraft is clear so that the mobile equipment can move easily.
CAUTION : DO NOT DIRECT FLUIDS ONTO FLIGHT COMPARTMENT OR CABIN

WINDOWS BECAUSE THIS CAN CAUSE CRACKING OF ACRYLICS OR PENETRATION OF THE WINDOW SEALING.

F. Make sure that all doors and windows are closed to prevent contamination of:
- galley floor areas with slippery de-icing/anti-icing fluids
- cabin linings and furnishings.

R G. Apply the anti-icing fluid to all the external surfaces of the aircraft
R with the mobile equipment but do not apply the fluid on:
- the APU air intake,
- the ram air inlets,
- the landing gear doors,
- the engine cowls and air intakes,
- the outflow valve air outlet,
- the pitot probes,
- the temperature sensors,
- the ice detection probes,
- the static probes,
- the AOA sensors.

NOTE : In the THS apron area, it is important to point the spray from the front to the rear. If you point the spray in the other direction (rear to front), anti-ice fluid can go into the rear fuselage non-pressurized compartment.

H. Take precautions to avoid any excess of de-icing fluid in the rudder, elevator and aileron servo-control areas, but use enough to eliminate the ice and the snow.

CAUTION : DO NOT USE WINDSHIELD WIPERS TO REMOVE THE DE-ICING/ANTI-ICING FLUID BECAUSE THIS WILL CAUSE SMEARING AND LOSS OF TRANSPARENCY.

J. Make sure that all fluid residues are removed from the forward areas prior to departure because the fluid can blow onto the windshield during
R taxi or take-off. If necessary, remove all traces of the fluid from the
R flight compartment windows and in particular the windshield.

NOTE : De-icing/anti-icing fluid can be removed by rinsing with clear water and wiping with a soft cloth.

5. Close-Up

A. Remove the mobile equipment.

B. Remove the ground support and maintenance equipment, the special and standard tools and all other items.

1. General

R NOTE : The anti-icing procedure and all the data related to the
R fluids are described in the Association of European Airlines (AEA)
R recommendations:
R "Recommendations for anti-icing of aircraft on ground" is
R available on the website www.aea.be.

NOTE : The operators must use the procedures applicable to their individual operating methods and requirements.

NOTE : The data given in the tables in this procedure are guidelines only.
The user can use these guidelines and his experience and knowledge of the local weather conditions to help him make the decision.
It is the responsibility of the user to make the decision about the applicable methods of protection.
The time of protection will be shorter in very bad weather conditions.
High wind speeds and jet blast can cause damage to the protective film. If these conditions occur, the time of protection will be much shorter.
The time of protection can also be much shorter if the wing temperature is lower than the OAT.
Because conditions are not always the same, a pre-take-off inspection is necessary when you use the times given in the tables.

The procedures prevent the formation of ice in some zones (wings, vertical stabilizer, horizontal stabilizer, rudder) and make the removal of snow from the aircraft easier.

WARNING : DO NOT APPLY ANTI-ICING FLUID IN:
- THE AIR INTAKES AND EXHAUST OF THE ENGINES OR APU
- THE AIR OUTLET OF THE OUTFLOW VALVE
- ALL OTHER AIR INTAKES OR OUTLETS.

CAUTION : DO NOT POINT HIGH-PRESSURE JETS:
- AT EQUIPMENT SUCH AS GEAR BOX SEALS, STEADY BEARINGS, ROTARY ACTUATORS AND UNIVERSAL JOINTS,
- AT ELECTRICAL COMPONENTS SUCH AS HARNESSES, PROXIMITY SENSORS AND CONNECTORS.

THE IMPACT PRESSURE OF THE JETS MUST NOT BE MORE THAN 5 PSI (0.35 BAR).
FOR FAIRINGS, THE IMPACT PRESSURE OF THE JETS MUST NOT BE MORE THAN 1.5 PSI (0.1 BAR).
HIGH-PRESSURE JETS CAN PUSH LIQUIDS INTO BEARINGS, JOINTS, BRAKES, ELECTRICAL CONNECTORS AND OTHER SEALED COMPONENTS.
LIQUIDS THAT GET INTO THESE AREAS CAN CAUSE CORROSION, FREEZE DURING AIRCRAFT FLIGHT, REMOVE NECESSARY LUBRICANTS OR START INCORRECT ELECTRICAL FUNCTIONS.

CAUTION : DO NOT USE JET EXHAUST TO REMOVE SNOW OR ICE FROM THE AIRFRAME.
THE HIGH PRESSURE AND HIGH TEMPERATURE OF JET EXHAUST CAN CAUSE DAMAGE TO THE AIRCRAFT.

2. Equipment and Materials

	ITEM	DESIGNATION
R	(1)Material No. 03-001	Oils (Ref. 20-31-00)
R	(2)	Brooms
R	(3)	Covers
R	(4)	Panels
R	(5)	Rag
R	(6)	Sealing Caps
R	(7)	Soft Brush
R	(8)	Warning Notice
R	(9)	Mobile Equipment for Aircraft De-Icing
	Referenced Procedures	
	- 10-11-00, P. Block 1	Parking
	- 12-33-21, P. Block 1	Ground Air Pre-Conditioning

3. Job Set-Up

R A. Not applicable

4. Procedure

A. De-icing with the Aircraft Parked in an Open Area (the aircraft engines are stopped)

R CAUTION : BEFORE YOU DO THE ANTI-ICING/DE-ICING PROCEDURE, ALWAYS PUT
R PROTECTION (SHEET MATERIAL) ON THE BRAKE UNITS.
R ANTI-ICING/DE-ICING FLUID CAN CAUSE CORROSION.
R

CAUTION : DURING THE DE-ICING AND WASHING PROCEDURES, MAKE SURE THAT THE HOT WATER OR HOT WATER/FLUID MIXTURES DO NOT CAUSE THE TEMPERATURE OF THE AIRCRAFT SKIN TO INCREASE TO MORE THAN +70°C.

(1)Put the mobile equipment in position.

NOTE : For use on the ramp, the mobile equipment has a storage tank for the anti-icing fluid.
Do not mix other fluids with the anti-icing fluid.
Use it at ambient temperature.

(2)Make sure that the APU and aircraft engines are stopped.

(3)Do the pre-conditioning of the aircraft (Ref. 12-33-21, P. Block 1).

(4)Put warning notices to tell persons to remove snow from their shoes and clothes before they go into the aircraft. This is very important in the cargo compartments. If there is ice or snow on the latches, this can cause defective operation of the cargo loading system.

R (5)Apply the anti-icing fluid to all the external surfaces of the aircraft
R with the mobile equipment but do not apply the fluid on:
- the APU air intake,
- the ram air inlets,
- the landing gear doors,
R - the brake system and landing gear wheels,
- the engine cowls and air intakes,

- the outflow valve air outlet,
- the pitot probes,
- the temperature probes,
- the ice detection probes,
- the static probes,
- the AOA sensors.

NOTE : In the THS apron area, it is important to point the spray from the front to the rear. If you point the spray in the other direction (rear to front), anti-icing fluid can go into the rear fuselage non-pressurized compartment.

(6)Take precautions to avoid any excess of de-icing fluid in the rudder, elevator and aileron servo control areas, but use enough to eliminate the ice and the snow.

NOTE : If the layer of snow is too thick, remove most of the snow with brooms (use brooms with soft bristles so that you do not damage the skin of the aircraft).

(7)Do not apply high-pressure jets directly to the autopilot pitch actuators.

(8)Make sure that there is no ice, frost or snow in the engine air intake, all the air inlets and outlets, and the engine fan blades (this includes the rear side of the engine fan blades).

(9)Remove ice or snow collected on the landing gear with a rag or a soft brush.

(10)If the handle of the cargo compartment door stays fully in:
- lubricate the handle and the latch with OILS (Material No. 03-001).

B. De-icing with the Aircraft Parked in an Open Area (engines running)

(1)Application of procedure with APU running

NOTE : Procedure is the same as described in Para. 4.A. above with the following additional operations.

CAUTION : SPECIAL CARE MUST BE TAKEN BY PERSONNEL NEAR APU AREA.

CAUTION : UNCONTROLLED INGESTION OF COMBUSTIBLE DE-ICING FLUIDS AND SOLUTIONS CAN CAUSE INTERNAL DAMAGE TO APU HOT SECTION PARTS AND IS A POTENTIAL FIRE HAZARD.

(a)Before starting the spraying operation:
- Close cabin air conditioning pack valves to prevent fumes entering cabin.
- Close APU BLEED VALVE.

NOTE : Avoid spraying fluid into APU air intake as well as exhaust.

(2)Application of procedure with engines running

WARNING : ENGINES MUST BE RUN AT IDLE FOR PERSONNEL SAFETY AND TO AVOID OCCURRENCE OF INCIDENTS CAUSED BY ENGINE BLAST OR SUCTION.

NOTE : Procedure is the same as described in Para. 4.A. above with the following additional operations.

(a)Close engine BLEED VALVES before starting the spraying operation.

(b)Do not allow spraying fluid into ENGINE air intakes and exhausts.

(c)When the spraying operation is completed, run engines at 60 % of N1

during 10 to 15 seconds to eliminate residual de-icing fluid.

C. De-icing after Landing With Snow on the Runways

(1)Make sure that landing gear safety pins are in position.

(2)Put the mobile equipment in position.

NOTE : For use on the ramp, the mobile equipment has a storage tank for the anti-icing fluid.
Do not mix other fluids with the anti-icing fluid.
Use it at the ambient temperature.

(3)If necessary, remove all signs of ice or snow from:

- the leading edge of the wing,
- the slat control mechanism: the PCU, gearboxes, torque shafts and tracks,
- the flap tracks, the carriages and the hinge mechanism,
- the rear spar area of the wing (above and in front of the flaps),
- the engine air intakes and the fan duct,
- the engine fan blades (this includes the rear side of the engine fan blades),
- the landing gear, specially the wheels and the brakes.

(4)If you think there will be snow:

- retract the flaps and the slats,
- retract the spoilers and the speed brakes,
- install the covers, the panels and the sealing caps (Ref. 10-11-00, P. Block 1).

Make sure that:

- the landing gear doors, the passenger/crew doors, the cargo compartment doors and the sliding windows are closed.

D. De-icing of the Aircraft by Infrared Facilities

CAUTION : DO NOT TRY TO OPERATE ANY OF THE FLIGHT CONTROL SURFACES IF THERE IS ICE ON THEM. IF YOU DO, YOU CAN CAUSE DAMAGE TO THE SYSTEM. SMALL SURFACE MOVEMENT IS PERMITTED AT HYDRAULIC POWER-UP OF AIRCRAFT.

(1)General facility specification

The facilities used are identified and proven "Infratek Radiant infrared de-icing facilities" or in accordance with the same design and Certification processes.

FAA AC No: 150/5300-14 gives specifications and guidance for aircraft de-icing facilities. Always use the latest issue. If the AC is superseded by inclusion into an FAA document or manual, use the latest issue of the document.

CAUTION : DURING THE INFRARED DE-ICING PROCEDURE, MAKE SURE THAT THE TEMPERATURE OF THE AIRCRAFT SKIN DOES NOT INCREASE TO MORE THAN +70 DEG.C (158.0 DEG.F).

(2)Procedures for the use of the facility

The procedures are provided by the InfraRed De-icing Facility (IRDF). They must be in accordance with the latest issue of the FAA regulations and SAE Standard Practice documents (see SAE ARP4737. Always use the latest issue).

(3)Aircraft de-icing confirmation

At the end of the infrared de-icing procedure, the airline inspector

R and the flight crew must make sure that the aircraft de-icing is
R completed.

R 5. Close-Up

R A. Remove the mobile equipment.

R B. Remove the ground support and maintenance equipment, the special and
R standard tools and all other items.

COLD WEATHER MAINTENANCE - AIR CONDITIONING

1. General

This procedure gives the cold weather maintenance practices for the air conditioning.

2. Referenced Procedures

- 12-31-38, P. Block 1 — Cold Weather Maintenance Water/Waste
- 12-33-21, P. Block 1 — Ground Air Pre-Conditioning

3. Procedure

A. General

(1) To know if ground conditioning is necessary, refer to tables 1 and 2 in the cold weather practices for the water/waste system (Ref. 12-31-38, P. Block 1).

(2) Ground conditioning will make preparation of the aircraft easier before despatch.
In some conditions, it is not necessary to drain all the water from the galley/cabin systems of the aircraft if you have ground conditioning (Ref. 12-33-21, P. Block 1).
NOTE : It is recommended that air supplied to the aircraft via the LP coupling does not exceed 70 deg.C (158 deg.F).

B. Recommendations

(1) In order to provide maximum protection for the aircraft and the systems,
R it is recommended to heat the aircraft, using the LP pre-conditioning
R procedure (Ref. 12-33-21, P. Block 1) if you think that the temperature can become equal to or lower than -55 deg.C (-67 deg.F).

(2) If the aircraft was in a cold soak configuration (without ground heating) with an OAT of -54 deg.C (-65 deg.F) or lower, for more than 12 hours, it is recommended to do an initial pre-conditioning (to increase the temperature to -54 deg.C (-65 deg.F) minimum) with the LP pre-conditioning procedure (Ref. 12-33-21, P. Block 1).
NOTE : It is recommended not to energize the computers until the temperature in the avionics compartment is equal to or higher than -15 deg.C (5 deg.F).

COLD WEATHER MAINTENANCE - ELECTRICAL POWER

1. General

This procedure gives the cold weather maintenance practices for the batteries when the aircraft is in a cold soak configuration.

2. Procedure

A. General

In very low temperatures, the chemical reaction of the electrolyte is slower and the performance of the batteries decreases :
- the quantity of high current the batteries can supply decreases,
- the time necessary to charge the batteries increases.

This procedure gives you instructions that keep the batteries serviceable.

NOTE : The values specified in this procedure are only applicable if the aircraft doors stay closed during the cold soak.

B. Battery Cold Weather Maintenance Practices

(1)The batteries can stay on the aircraft during the cold soak if :
- the OAT stays higher than -15 deg.C (+5 deg.F),
- the OAT is approximately -15 deg.C (+5 deg.F) for not more than 12 hours,
- the OAT is between -15 deg.C (+5 deg.F) and -30 deg.C (-22 deg.F) for not more than 6 hours.

R However, you must remove the battery if the temperature has been below -15 deg.C (+5 deg.F) for more than 12 hours.

(2)You must remove the batteries if the OAT is lower than -30 deg.C (-22 deg.F) during the cold soak.

NOTE : We recommend that you use a ground power unit to start the APU if the OAT was lower than -15 deg.C (+5 deg.F) during the cold soak.

COLD WEATHER MAINTENANCE - EQUIPMENT/FURNISHINGS

1. General

This procedure gives the cold weather maintenance practices for the equipment/furnishings.

WARNING : DO NOT OPEN PRESSURE SEALED DOORS WHEN THE AIRCRAFT IS PRESSURIZED (FULLY OR NOT FULLY). THIS WILL CAUSE EXPLOSIVE DECOMPRESSION, KILL OR CAUSE INJURY TO PERSONS AND CAUSE DAMAGE TO THE AIRCRAFT.

WARNING : BEFORE YOU SUPPLY AIR FROM AN EXTERNAL SOURCE OR THE APU, MAKE CERTAIN THAT :

- **AT LEAST ONE FLIGHT COMPARTMENT WINDOW OR CABIN DOOR IS OPEN AND THAT IT REMAINS OPEN DURING SERVICING.**
- **IF THE AIRCRAFT IS PARKED OUTSIDE AND IS NOT PROTECTED FROM THE RAIN, ONE MAINTENANCE DOOR OR AVIONICS COMPARTMENT ACCESS DOOR IS OPEN AND THAT IT REMAINS OPEN DURING SERVICING.**

2. Equipment and Materials

ITEM	DESIGNATION
(1)Material No. 04-017	Common Greases (Ref. 20-31-00)
R (2)Material No. 04-004	Common Greases (Ref. 20-31-00)
R (3)Material No. 05-027B	Special Materials (Ref. 20-31-00)
Referenced Procedure	
- 12-31-38, P. Block 1	Cold Weather Maintenance - Water/Waste
R - 25-52-55, P. Block 401	Servo Mechanism and Actuator

3. Procedure

A. Cargo Door Sill Latch Compartment

(1)Remove floor covering.

R (2)Remove manual release cable covering.

R (3)Make sure that the area is clean and clear.

R (4)Apply a coat (Material No. 05-027B) to latch mechanism.

R **CAUTION : ENSURE THAT THE SPACE BETWEEN MANUAL RELEASE CABLE AND GUIDE TUBE IS FULLY FILLED WITH GREASE TO AVOID MALFUNCTION BY FROZEN MOISTURE.**

R (5)Inject common grease (Material No. 04-004) to the manual release cable and guide tube.

R (6)Install floor covering.

R (7)Install manual release cable covering.

B. Cabin Escape Facilities

(1)Girt Bar

(a)If you park the aircraft not heated, make sure that all snow or slush around the door threshold area is removed before you close the doors of the aircraft.

(b)Clean dirt and old lubricant from the girt bar floor-brackets, the sliders and the fittings. Do this check every 350 flight hours or more frequently as necessary.

(c)Apply a coat of Material No. 04-017 to the girt bar floor-brackets, the sliders and the fittings.

C. Escape Slides

(1)If the aircraft is exposed to temperature changes (from cold to warm), the pressure gages of the escape slides can give **NO GO** indication for a short time because the green temperature compensator cursor in the gage reacts to temperature changes faster than the gas expansion in the bottle.

(2)**NO GO** indications may occur for short periods under the following circumstances :

- if the cabin door is open in cold condition when the aircraft is being prepared or while passengers are embarking,
- when the aircraft is heated for flight preparation after the aircraft has been parked unheated and allowed to cool.

(3)After closing of the doors and when the aircraft temperature becomes stable, the **NO GO** indication is no longer present.

D. Galley Equipment

(1)You must drain all the galley equipment which contains water, such as coffee makers and water boilers.

(2)You must operate the taps several times to make sure that the supply lines are empty (Ref. 12-31-38, P. Block 1).

(3)If it is not possible to drain all the galley equipment, it is recommended to apply heating as follows :

OUTSIDE AIR TEMPERATURE	EXTERNAL HEAT SOURCE	APU	SUPERVISOR	DRAINING OF WATER SYSTEM
0 deg.C (32 deg.F) to -5 deg.C (23 deg.F)	1 HOUR EVERY 4 HOURS	NO	NO	NO
-5 deg.C (23 deg.F) to -10 deg.C (14 deg.F)	2 HOURS EVERY 4 HOURS	NO	NO	NO
-10 deg.C (14 deg.F) to -15 deg.C (5 deg.F)	CONTINUOUS	NO	NO	NO
BELOW -15 deg.C	CONTINUOUS	AS REQUIRED	YES	YES

OUTSIDE AIR TEMPERATURE	EXTERNAL HEAT SOURCE	APU	SUPERVISOR	DRAINING OF WATER SYSTEM
(5 deg.F)				

R E. First Aid Kits (if installed)
R (1)Remove the first aid kits from the aircraft if the cabin temperature is
R below -10 deg.C (+14.00 deg.F).

R NOTE : To avoid damage to the kit equipment, keep the kits in a place
R with a temperature between min. 1 deg.C (33.80 deg.F) and
R 40 deg.C (104.00 deg.F) max.

R (2)Put a **WARNING NOTICE** in position to tell personnel that the first aid
R kits are removed.

R F. Doctors Kit (if installed)
R (1)Remove the doctors kits from the aircraft if the cabin temperature is
R below 1 deg.C (33.80 deg.F).

R NOTE : To avoid damage to the kit equipment, keep the kits in a place
R with a temperature between min. 1 deg.C (33.80 deg.F) and
R 40 deg.C (104.00 deg.F) max.

R (2)Put a **WARNING NOTICE** in position to tell personnel that the doctors kits
R are removed.

COLD WEATHER MAINTENANCE - FLIGHT CONTROLS

1. General

This procedure gives the cold weather maintenance practices for the flight controls.

WARNING : PUT THE SAFETY DEVICES AND THE WARNING NOTICES IN POSITION BEFORE YOU START A TASK ON OR NEAR:
- THE FLIGHT CONTROLS,
- THE FLIGHT CONTROL SURFACES,
- THE LANDING GEAR AND THE RELATED DOORS,
- COMPONENTS THAT MOVE.

2. Equipment and Materials

ITEM	DESIGNATION
(1) Material No. 10-001	Anti-Icing and De-Icing Materials (Ref. 20-31-00)
(2) Material No. 10-003	Anti-Icing and De-Icing Materials (Ref. 20-31-00)
R (3) Material No. 10-004	Anti-Icing and De-Icing Materials
R	(Ref. 20-31-00)
R (4) Material No. 10-005	Anti-Icing and De-Icing Materials
R	(Ref. 20-31-00)
Referenced Procedure	
- 12-22-27, P. Block 1	Lubrication of Flight Controls
R - 12-31-11, P. Block 1	Anti-Icing Protection

3. Procedure

A. Check of the Flight Controls

(1) Make sure that ice and/or snow is not forced into the areas between the flight control surfaces during the de-icing procedures.

(2) Remove any ice from:
- the wing leading edge,
- the slats,
- the flaps,
- the spoilers,
- the ailerons.

(3) You must retract the wing flaps and slats during periods of snowfall and icing conditions. If it is necessary to operate these controls, make sure that they are clear of accumulation before retraction.

(4) If an aircraft arrives with the slats and flaps in a position other than fully retracted during a period of ice or snow conditions, those slats and flaps which are extended must be inspected for ice and snow accumulation before retraction.

(5) All control surfaces must have no ice, snow or frost. After the de-icing operation, do a check of the associated hinges, tracks, actuators and servo controls for trapped moisture that can freeze.

R Apply anti-icing fluid (Material No. 10-001) or (Material No. 10-003)
R or Material No. 10-004) or (Material No. 10-005)

R (Ref. 12-31-11, P. Block 1).

(6)Do a check of the leading edge area of the spoilers and the flaps for ice, snow and frost.

(7)Final checks after aircraft de-icing on flap/slat areas : the applicable areas must have no snow and ice as well as water accumulation. During snowfall, freezing rain and drifting snow, it is possible that snow and melting ice go into slots, drainage openings, hinges and operating linkages and freeze again. You must do the check of these areas with special attention when an aircraft has been parked outside for a long period in the above conditions.

B. Lubrication of the Flaps and Slats

(1)Do the applicable flap/slat lubrication task (Ref. 12-22-27, P. Block 1).

(2)The winter preparation program must include the flap and slat lubrication.

NOTE : In climates where the atmosphere is both particularly cold and humid (mist/fog), use your experience to reduce the lubrication task intervals during winter operations.

NOTE : In extreme climates and low ambient temperatures, it may be difficult to lubricate the flap and slat systems correctly. If hangar space is not available, then it is recommended to do the lubrication tasks at a station where the appropriate facilities are available or where the ambient temperature is above 0 deg.C (32 deg.F).

NOTE : Increases in grease stiffness may occur if water present within a lubricant forms discrete lumps of ice. The associated increases in system friction may then result in torque limiter operation.

(3)When you do the lubrication tasks, take care to ensure that all the old grease is removed in order to reduce the risk of an increase in grease stiffness.

COLD WEATHER MAINTENANCE - FUEL

WARNINGS : OBEY THE FUEL SAFETY PROCEDURES (Ref. 28-00-00, P. Block 301).
: MAKE SURE THE AREA AROUND THE AIRCRAFT IS SAFE BEFORE YOU START THE REFUEL/DEFUEL PROCEDURE. IN THE SAFETY AREA, DO NOT:
- SMOKE,
- MAKE SPARKS OR FIRE,
- USE ANY EQUIPMENT WHICH IS NOT APPROVED FOR REFUEL/DEFUEL PROCEDURES.
AIRCRAFT FUEL IS FLAMMABLE.

: MAKE SURE THAT THE HOT AIR BLOWERS ARE REMOVED FROM THE AIRCRAFT BEFORE YOU START THE REFUEL/DEFUEL PROCEDURE.

1. General

This section gives cold-weather maintenance practices for the fuel system if
R an aircraft is operated or stored in conditions with ground temperatures below
R 0 deg. C. (32 deg. F.).

R If an aircraft is operated with a destination where the ambient temperature
R is above 0 deg. C. (32 deg. F.) and the turn round time is sufficiently long,
R it is recommended that you do the water drainage checks there (Ref. 12-32-28,
R P. Block 301).

Fuel storage and handling conditions can significantly affect the amount of water in solution with the fuel. Under the poorest conditions, each 3785 liters (1000 US gals) of fuel can contain up to 0.76 liter (0.2 US gal) of water.

Water may enter a fuel tank by several methods:
- water may be delivered to the aircraft already in the fuel
- the air in the tank usually contains water
- large quantities of moist air may enter the tank during descent
- fuel exposed to wet atmospheric conditions can contain larger quantities of water than fuel stored in sealed containers.

Water that enters a fuel tank will fall to the bottom and collect at the lowest points of the fuel tank where it can turn into ice.

Formation of ice and water in the fuel tanks can have an effect on the accuracy of the fuel quantity indicator and related system performance in addition to any engine or corrosion-related problems.

Approved anti-icing additive may be added, in approved proportions, to the fuel which is delivered to the aircraft. This may prevent any water present from freezing and let it be drained from the tank with a fuel temperature below 0 deg. C. (32 deg. F.).

The procedures that follow let any water/ice to be removed if anti-icing additive is used or not.

Ice in the fuel tank can be melted by:
- ambient air heat in a hangar,
- warm air heat, with a blower, until the temperature of the whole of the bottom skin of the tank is 1 deg. C. (34 deg. F.). This procedure is carried out inside a hangar.
- a combination of these methods.

2. Reason(s) for the Job

A. To remove ice from inside the fuel tanks with ambient air heat in a hangar.

B. To remove ice from inside the fuel tanks with a hot air blower in a hangar.

R NOTE : You can also do this procedure outside of a hangar if a hangar is
R not available.

C. Preparation for operation of the fuel quantity indicator (FQI) below -40 deg. C. (-40 deg. F.).

D. Preparation for operation of the refuel/defuel panel 110VU, below -40 deg. C. (-40 deg. F.).

E. To examine the outer-tank manhole cover 550AB (650AB) for fuel leaks.

3. Methods of Ice Removal

A. To remove ice from inside the wing tanks:
- use para. 4
- or, para. 5.

B. To remove ice from inside the center tank, use para. 4.

C. To remove ice from inside the trim tank:
- use para. 4
- or, a combination of para. 4 and para. 5.

**ON A/C 101-200,

D. To remove ice from inside the ACT(s):
- use the aircraft airconditioning system to heat the ACT(s)
- or, use para. 4.

R **ON A/C ALL

4. Remove Ice From Inside The Fuel Tanks With Ambient Air Heat in a Hangar

A. Equipment and Materials

ITEM	DESIGNATION
A.	Approved Hot-Air Blower for External use Max Temp of +50 deg. C. (+122 deg. F.)
B.	Surface Contact Thermometer -10 deg. C. to +50 deg. C. (-12 deg. F to +122 deg. F.)
C.	Thermometer +1 deg. C. to -54 deg. C. (34 deg. F. to -67 deg. F.)
Referenced Procedures	
- 12-11-28, P. Block 301	Replenishing of Fuel Tanks
- 12-31-12, P. Block 1	Ice and Snow Removal
- 12-32-28, P. Block 301	Fuel - Servicing
- 28-00-00, P. Block 301	Fuel - General
- 28-25-00, P. Block 301	Refuel/Defuel system

B. Job Set-Up

(1)Refuel or defuel or transfer fuel (Ref. 12-11-28 or 28-25-00, P. Block 301) to the quantities that follow:

R **ON A/C 001-100,

TANK	L OUTR	L INR	CENTER	R INR	R OUTR	TRIM
kg	300 min	700 min	700 min	700 min	300 min	700 min
(lb)	(660) min	(1540) min	(1540) min	(1540) min	(660) min	(1540) min

R **ON A/C 101-200,

TANK	OUTER LEFT	INNER LEFT	CENTER	ACT (IF FITTED)	INNER RIGHT	OUTER RIGHT	TRIM
lb	660 min	1540 min	1540 min	NIL	1540 min	660 min	1540 min
(kg)	(300) min	(700) min	(700) min	(NIL)	(700) min	(300) min	(700) min

R **ON A/C 101-200,

Post SB 28-2105 For A/C 101-200,

R Post SB 28-2126 For A/C 104-104,

TANK	L OUTR	L INR	CENTER	ACT 1/ACT 2	R INR	R OUTR	TRIM
kg	300 min	700 min	700 min	NIL	700 min	300 min	700 min
(lb)	(660) min	(1540) min	(1540) min	(NIL)	(1540) min	(660) min	(1540) min

**ON A/C ALL

NOTE : This will make sure that the level of fuel is sufficient to force any water through the drain valves.

(2)Remove external snow and/or ice from the wings and/or the trimmable horizontal stabilizer (THS) (Ref. 12-31-12, P. Block 1).

(3)Move the aircraft into a hangar that has an ambient air temperature above 1 deg. C. (34 deg. F.).

C. Procedure

(1)Use a surface contact thermometer to measure the temperature of the bottom skin of the tank to be drained. Let the ambient air temperature warm the aircraft until the temperature of all the bottom skin of the tank to be drained is at least 1 deg. C. (34 deg. F.).

CAUTION : DO NOT APPLY ABNORMALLY HIGH FORCE TO THE WATER DRAIN VALVE. IF IT DOES NOT OPEN WITH NORMAL FORCE, INVESTIGATE THE REASON. IT MAY BE FROZEN DUE TO THE LOW TEMPERATURE. IF IT IS FROZEN, HEAT IT WITH AN APPROVED HOT AIR BLOWER. THE TEMPERATURE OF THE HOT AIR MUST NOT EXCEED +50 DEG. C. (+122 DEG. F.).

(2)Do the fuel sampling for water contamination procedure at least 30 minutes after refueling or defueling was completed and the booster pumps were switched off (Ref. 12-32-28, P. Block 301).

NOTE : This will let any water settle at the lowest point(s) in the tanks.

D. Close-Up

(1)Remove the surface contact thermometer.
(2)Make sure that the work area is clean and clear of tools and other items of equipment.
(3)Refuel or defuel or transfer fuel as required (Ref. 12-11-28 or 28-25-00, P. Block 301).

5. Remove Ice From Inside The Fuel Tanks With a Hot Air Blower in a Hangar

A. Equipment and Materials

ITEM	DESIGNATION
A.	Approved Hot-Air Blower, for External use Max Temp of +50 deg. C. (+122 deg. F.)
B.	Surface Contact Thermometer -10 deg. C. to +50 deg. C. (-12 deg. F to +122 deg. F.)
C.	Thermometer - 0 deg. C. to -54 deg. C. (32 deg. F. to -67 deg. F.)
Referenced Procedures	
- 12-11-28, P. Block 301	Replenishing of Fuel Tanks
- 12-31-12, P. Block 1	Ice and Snow Removal
- 12-32-28, P. Block 301	Fuel - Servicing
- 28-00-00, P. Block 301	Fuel - General
- 28-25-00, P. Block 301	Refuel/Defuel system

B. Job Set-Up
(1)Refuel or defuel or transfer fuel (Ref. 12-11-28 or 28-25-00, P. Block 301) to the quantities listed in para. 4. B. (1).
(2)Remove external snow and/or ice from the wings and/or the trimmable horizontal stabilizer (THS) (Ref. 12-31-12, P. Block 1).
(3)Move the aircraft into a hangar.

C. Procedure
(1)Use a surface contact thermometer to measure the temperature of the bottom skin of the tank to be drained.

CAUTION : MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE HOT AIR BLOWER IS NOT MORE THAN 50 DEG. C. (122 DEG. F.). IF THE TEMPERATURE IS MORE THAN 50 DEG. C. (122 DEG. F.) YOU CAN CAUSE DAMAGE TO THE COMPONENT(S).

(2)Use an external hot air blower to warm all the bottom skin of the tank to be drained. Make sure that the temperature of the bottom skin does not rise above 50 deg. C. (122 deg. F.). The temperature of all the bottom skin of the tank to be drained should be at least 1 deg. C. (34 deg. F.) measured at least 1 minute after the removal of the hot air blower.

CAUTION : DO NOT APPLY ABNORMALLY HIGH FORCE TO THE WATER DRAIN VALVE. IF IT DOES NOT OPEN WITH NORMAL FORCE, INVESTIGATE THE REASON. IT MAY BE FROZEN DUE TO THE LOW TEMPERATURE. IF IT IS FROZEN, HEAT IT WITH AN APPROVED HOT AIR BLOWER. THE TEMPERATURE OF THE HOT AIR MUST NOT EXCEED 50 DEG. C. (122 DEG. F.).

(3)Do the fuel sampling for water contamination procedure at least 30 minutes after refueling or defueling was completed and the booster pumps

were switched off and before the skin temperature near the water drain valves falls to 0 deg. C. (32 deg. F.) (Ref. 12-32-28, P. Block 301).

NOTE : This will let any water settle at the lowest point(s) in the tanks.

D. Close-Up
(1)Remove the external hot air blower.
(2)Remove the surface contact thermometer.
(3)Make sure that the work area is clean and clear of tools and other items of equipment.
(4)Refuel or defuel the aircraft as required (Ref. 12-11-28 or 28-25-00, P. Block 301).

6. Preparation For Operation of The Fuel Quantity Indicator System (FQIS) Below -40 Deg. C. (-40 Deg. F.).

NOTE : This procedure prepares the FQIS for use in flight. For preparation for use of the refuel/defuel panel 110VU, refer to para. 7.

A. Equipment and Materials

ITEM	DESIGNATION
A.	Approved Hot-Air Blower for Electronics Bay Max Temp of +50 deg. C. (+122 deg. F.)
B.	Thermometer -0 deg. C. to -54 deg. C. (32 deg. F. to -67 deg. F.)
Referenced Procedures	
- 12-31-00, P. Block 1	Cold Weather Maintenance
- 24-41-00, P. Block 301	AC External Power Control

B. Job Set-Up

(1)Make sure that the electrical network is de-energized (Ref. 24-41-00, P. Block 301).

(2)Make sure that the circuit breakers that follow are open and the safety clips and tags are installed:

NOTE : The circuit breakers that follow will have been opened during the preparation of the aircraft before the cold soak condition (Ref. 12-31-00, P. Block 1).

PANEL	SERVICE	IDENT.	LOCATION
22VU	FUEL/TK LO LVL AND CAL/L OUTR AND R INR AND CTR R	1QJ	208/B26
22VU	FUEL/TK LO LVL AND CAL/R OUTR AND L INR AND CTR L	2QJ	208/B27
132VU	FUEL/FQI/CHAN SUPPLY 1	3QT	321/P60
132VU	FUEL/FQI/CHAN SUPPLY 2	4QT	321/P61

PANEL	SERVICE	IDENT.	LOCATION
132VU	FUEL/FUELLING OVERFLOW AND CALIBRATION	5QJ	321/P58
132VU	FUEL/FUELLING HI LVL	6QJ	321/P57

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

C. Procedure

CAUTION : MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE HOT AIR BLOWER IS NOT MORE THAN 50 DEG. C. (122 DEG. F.). IF THE TEMPERATURE IS MORE THAN 50 DEG. C. (122 DEG. F.) YOU CAN CAUSE DAMGE TO THE COMPONENT(S).

(1)Use a thermometer to do a temperature check of the electronics bay. If it is -15 deg. C. (5 deg. F.) or below, use an approved hot-air blower to warm the area.
(2)Approximately 30 minutes after the temperature of the electronics bay has risen above -15 deg. C. (5 deg. F.) remove the safety clips and tags and close the circuit breakers 1QJ, 2QJ on panel 22VU and 3QT, 4QT, 5QJ and 6QJ on panel 132VU. The FQIS is now functional.

D. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Remove the thermometer from the electronics bay.
(3)Make sure that the work area is clean and clear of tools and other items of equipment.

7. Preparation For Operation of The Refuel/Defuel Panel 110VU, Below -40 Deg. C. (-40 Deg. F.).

CAUTION : DO THE PROCEDURE IN PARA. 6. TO WARM THE ELECTRONICS BAY, BEFORE YOU START THIS PROCEDURE.

A. Equipment and Materials

ITEM	DESIGNATION
A.	Approved Hot-Air Blower, For External use Max Temp of +50 deg. C. (+122 deg. F.)
B.	Thermometer -0 deg. C. to -54 deg. C. (32 deg. F. to -67 deg. F.)
Referenced Procedures	
- 12-31-00, P. Block 1	Cold Weather Maintenance
- 24-41-00, P. Block 301	AC External Power Control

B. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Activate the ECAM display units as follows:
(a)On the flight-compartment center pedestal, push (in) the ECAM SGU 1 and 2 P/BSW's.
(b)Turn the LEFT AND RIGHT DISPLAY rotary switches clockwise to switch on the display and adjust the brightness to the required level.
(c)Push (in) the FUEL P/BSW to call up the fuel page.
(3)Open the access door 144DR to the refuel/defuel panel 110VU.

NOTE : When the aircraft electrical network is energized, the refuel/defuel panel will energize automatically when the access door 144DR is opened.

C. Procedure
(1)On refuel/defuel panel 110VU, make sure that the PWR SUPPLY switch is set to NORM and guarded.

CAUTION : MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE HOT AIR BLOWER IS NOT MORE THAN 50 DEG. C. (122 DEG. F.). IF THE TEMPERATURE IS MORE THAN 50 DEG. C. (122 DEG. F.) YOU CAN CAUSE DAMAGE TO THE COMPONENT(S).

(2)Use an approved hot-air blower to warm the refuel/defuel panel 110VU, for 15 minutes. Make sure that the temperature does not rise above 50 deg. C. (122 deg. F.).
(3)Compare the FQI value on refuel/defuel panel 110VU, with the FQI value on panel 430VU, in the flight compartment. If there is any difference then continue to warm the refuel/defuel panel 110VU, until the values are the same.
(4)Compare the preselector total-fuel-quantity value on the refuel/defuel panel 110VU, with the ECAM value in the flight compartment. If there

is any difference then continue to warm the refuel/defuel panel 110VU, until the values are the same.

(5)When the values are the same, disconnect the hot air blower(s) and remove them from the aircraft.

D. Close-Up

(1)On the flight-compartment center pedestal, turn the ECAM LEFT and RIGHT DISPLAY rotary switches to OFF.

(2)Release (out) the ECAM SGU 1 and 2 P/BSWs.

(3)Close the access door 144DR.

NOTE : The refuel/defuel panel is now de-energized.

(4)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(5)Remove the thermometer from the electronics bay.

(6)Make sure that the work area is clean and clear of tools and other items of equipment.

8. Examine the Outer-Tank Manhole Cover 550AB (650AB) for Fuel Leaks

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3 m (10 ft)
Referenced Procedures	
- 12-11-28, P. Block 301	Replenishing of Fuel Tanks
- 24-41-00, P. Block 301	AC External Power Control
- 28-11-00, P. Block 801	Tanks
- 28-25-00, P. Block 301	Refuel/Defuel System

B. Job Set-Up

(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(2)Make sure that these circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
132VU	FUEL/FQI/CHAN SUPPLY 1	3QT	321/P60
132VU	FUEL/FQI/CHAN SUPPLY 2	4QT	321/P61

(3)In the flight compartment, on panel 430VU, read the quantity of fuel in in the outer tanks. If necessary, refuel or transfer fuel (Ref. 12-11-28 or 28-25-00, P. Block 301) to fill the two outer tanks to maximum capacity.

(4)Put the access platform in position below the outer-tank manhole cover 550AB (650AB).

C. Procedure

(1)Count the number of fuel drops/minute that fall from the outer-tank manhole cover 550AB (650AB). The leak categories and related actions are as follows:

WARNING : USE AN APPROVED METAL CONTAINER TO CATCH FUEL LEAKAGE WHILE THE AIRCRAFT IS PARKED. IT IS DANGEROUS TO LET FUEL COLLECT ON THE GROUND BELOW THE AIRCRAFT.

: CAREFULLY MONITOR A LEAK TO MAKE SURE:
- IT DOES NOT EXTEND TO A CRITICAL AREA OF THE AIRCRAFT
- FUEL IS NOT BLOWN INTO THE FUSELAGE AREAS.

LEAK CATEGORY, DROPS/MINUTE			
1 TO 15	16 TO 30	31 TO 60	61 OR MORE
W	X	Y	Z

W - A repair is optional. If the leak is not repaired, do an inspection before each flight to make sure there is no change in the leak rate.

X - A repair is optional. If the leak is not repaired, do an inspection before each flight to make sure there is no change in the leak rate. It is recommended that the leak is repaired at the next scheduled maintenance check (Ref. 28-11-00, P. Block 801).

Y - Repair the leak as soon as possible. It is recommended that the leak is repaired before the next flight (Ref. 28-11-00, P. Block. 801).

Z - Repair the leak before the next flight (Ref. 28-11-00, P. Block 801).

D. Close-Up

(1) If necessary, defuel or transfer fuel from the outer tanks (Ref. 12-11-28 or 28-25-00, P. Block 301).

(2) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3) Remove the access platform.

(4) Make sure that the work area is clean and clear of tools and other items of equipment.

COLD WEATHER MAINTENANCE - HYDRAULIC POWER

1. General

This task provides cold weather maintenance practices for hydraulic power.

2. Procedure

A. Recommendations for OAT equal to or above -40 deg.C (-40 deg.F)

(1)Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 12-12-29, P. Block 1	Hydraulics

(2)Fluid level

(a)Refer to the table of the fluid level, depending on the ambient temperature, given in the hydraulic reservoir replenishing procedure (Ref. 12-12-29, P. Block 1).

B. Recommendations for OAT below -40 deg.C (-40 deg.F)

(1)Fluid level prior to departure for a very cold destination.

(a)When OAT is more than 10 deg.C (50 deg.F) and aircraft departing for a very cold destination (OAT lower than -40 deg.C (-40 deg.F), nominal level in Green and Blue hydraulic reservoirs must be increased by 3 liters to avoid a low level warning (due to fluid retraction) at very low temperatures.

(2)Fluid level in very cold condition

CAUTION : AT A VERY COLD AIRPORT (OAT LOWER THAN -40 DEG.C (-40 DEG.F), NEVER TOP UP HYDRAULIC RESERVOIRS TO RESTORE NOMINAL LEVEL.

(a)At a very cold airport (OAT lower than -40 deg.C (-40 deg.F), due to fluid retraction at low temperatures, fluid level in hydraulic reservoirs decreases.

NOTE : To obtain correct level indication :
- aircraft must be in cold soak condition for at least 5 hours to allow fluid to stabilize at ambient temperature.
- there must be no significant leaks.

1 If fluid level on quantity indicator is in the green arc or just in the yellow arc :
- do not top up reservoirs.

2 If fluid level is clearly in the yellow arc :
- top up reservoirs until fluid level indicator is just in the green arc but do not restore nominal level.

(3)Green Electric Pump Starting Procedure

NOTE : This procedure is to be applied if Green electric pumps failed to start after several attempts after a cold soak condition at very low temperatures.

(a)Procedure

1 On HYD PWR section of panel 471VU, place and hold ELEC PUMPS TEST switch in PUMP 2 position.

2 On HYD PWR panel 427VU, press ELEC PUMPS pushbutton switch (ON legend

on).
3 When Green system pressure is more than 151.68 bar (2200 psi), release ELEC PUMPS TEST switch (neutral position).
4 Wait until Green system pressure is more than 151.68 bar (2200 psi).
5 On HYD PWR panel 427VU, press G/B PTU pushbutton switch (ON legend on).
6 Wait until Blue system pressure is more than 151.68 bar (2200 psi).
7 On HYD PWR panel 427VU, press G/Y PTU pushbutton switch (ON legend on).
8 Wait until Yellow system pressure is more than 151.68 bar (2200 psi).
9 When the pressure of the 3 hydraulic systems is more than 151.68 bar (2200 psi) you can operate hydraulically powered components.

COLD WEATHER MAINTENANCE - HYDRAULIC POWER

1. General
This task provides cold weather maintenance practices for hydraulic power.

2. Procedure

A. Recommendations for OAT equal to or above -40 deg.C (-40 deg.F)
(1)Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 12-12-29, P. Block 1	Hydraulics

(2)Fluid level
(a)Refer to the table of the fluid level, depending on the ambient temperature, given in the hydraulic reservoir replenishing procedure (Ref. 12-12-29, P. Block 1).

B. Recommendations for OAT below -40 deg.C (-40 deg.F)
(1)Fluid level prior to departure for a very cold destination.
(a)When OAT is more than 10 deg.C (50 deg.F) and aircraft departing for a very cold destination (OAT lower than -40 deg.C (-40 deg.F), nominal level in Green and Blue hydraulic reservoirs must be increased by 3 liters to avoid a low level warning (due to fluid retraction) at very low temperatures.
(2)Fluid level in very cold condition
CAUTION : AT A VERY COLD AIRPORT (OAT LOWER THAN -40 DEG.C (-40 DEG.F), NEVER TOP UP HYDRAULIC RESERVOIRS TO RESTORE NOMINAL LEVEL.
(a)At a very cold airport (OAT lower than -40 deg.C (-40 deg.F), due to fluid retraction at low temperatures, fluid level in hydraulic reservoirs decreases.
NOTE : To obtain correct level indication :
- aircraft must be in cold soak condition for at least 5 hours to allow fluid to stabilize at ambient temperature.
- there must be no significant leaks.
1 If fluid level on quantity indicator is in the green arc or just in the yellow arc :
- do not top up reservoirs.
2 If fluid level is clearly in the yellow arc :
- top up reservoirs until fluid level indicator is just in the green arc but do not restore nominal level.
(3)Green Electric Pump Starting Procedure
NOTE : This procedure is to be applied if Green electric pumps failed to start after several attempts after a cold soak condition at very low temperatures.
(a)Procedure
1 On HYD PWR section of panel 471VU, place and hold ELEC PUMPS TEST switch in PUMP 2 position.
2 On HYD PWR panel 427VU, press ELEC PUMPS pushbutton switch (ON legend

on).
3 When Green system pressure is more than 151.68 bar (2200 psi), release ELEC PUMPS TEST switch (neutral position).
4 Wait until Green system pressure is more than 151.68 bar (2200 psi).
5 On HYD PWR panel 427VU, press G/B PTU pushbutton switch (ON legend on).
6 Wait until Blue system pressure is more than 151.68 bar (2200 psi).
7 On HYD PWR panel 427VU, press G/Y PTU pushbutton switch (ON legend on).
8 Wait until Yellow system pressure is more than 151.68 bar (2200 psi).
9 When the pressure of the 3 hydraulic systems is more than 151.68 bar (2200 psi) you can operate hydraulically powered components.

COLD WEATHER MAINTENANCE - INDICATING/RECORDING SYSTEMS AND NAVIGATION

1. General

This procedure gives the cold weather maintenance practices for indicating/recording and navigation systems.

2. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 12-31-21, P. Block 1	Cold Weather Maintenance - Air Conditioning

3. Procedure

A. General

(1)When the Outside Air Temperature (OAT) is very low, cold (temperature lower than -15 deg.C (+5 deg.F)) in the avionics compartment can cause incorrect operation of the computers.

NOTE : This is only due to the cold weather conditions and not to a technical malfunction.

B. Recommendations

(1)Make sure that the computers are at a temperature equal to or higher than -15 deg.C (+5 deg.F) for correct operation.

NOTE : If you energize the computers at very low temperatures, the following can occur. If the temperature is :

R - equal to or lower than -40 deg.C (-40 deg.F), you can cause permanent damage to the computers.

R - between -40 deg.C (-40 deg.F) and -15 deg.C (+5 deg.F), the computers can operate but normal operation can stop momentarily.

- equal to or higher than -15 deg.C (+5 deg.F), the computers operate normally.

(a)Preconditioning

It is recommended to use the pre-conditioning procedure to increase the temperature in the avionics compartment (Ref. 12-31-21, P. Block 1).

(b)Energization of the computers

If the temperature is higher than -40 deg.C (-40 deg.F), you can energize the computers to increase the temperature to -15 deg.C (+5 deg.F). The time necessary to increase the temperature will change with the OAT, the humidity and the time since the avionics compartment ventilation stopped.

COLD WEATHER MAINTENANCE - LANDING GEAR

1. General

This procedure gives the cold weather maintenance practices for the landing gear.

2. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 12-14-32, P. Block 1	Inflating and Charging - Landing Gear

3. Procedure

A. General

(1) When the ambient temperature decreases, the pressure in the tires also decreases.
A 3 deg.C (5.40 deg.F) change in temperature causes a 1% change in tire pressure.
NOTE : The tires wear faster if the pressure in the tires is low.

(2) If there is a large temperature decrease between the departure and the destination airport, adjust the tire pressure (Ref. 12-14-32, P. Block 1).

B. Recommendations

(1) Check the tire pressure
If the aircraft is parked in cold weather conditions (cold soak) for more than one hour, do a check of the tire pressure.
If necessary, correct the pressure with nitrogen.
NOTE : Do not use air to correct the tire pressure if the ambient temperature is below 0 deg.C (32 deg.F). Moisture in the air can change to ice in the valve and cause a permanent leak.
NOTE : Tires may be replenished with air at remote stations where dry
R nitrogen is not available, provided that :
R - the oxygen content does not exceed 5% by volume (Ref. 12-14-32,
R P. Block 1),
R - the tire valve does not leak after inflation,
R - the air does not stay in the tire for more than 15 hours. You
R must service the tire with dry nitrogen at the end of this
R time.

(2) Towing
Be careful during aircraft towing operations in cold weather conditions. Do not make small-radius turns which can cause too much load on the sidewalls of the tires.

COLD WEATHER MAINTENANCE - CREW OXYGEN SYSTEM

1. General

This procedure gives the cold weather maintenance practices for crew oxygen maintenance

2. Equipment and Materials

ITEM	DESIGNATION
(1)Material No. 05-004	Special Materials (Ref. 20-31-00)

Referenced Procedure

R **ON A/C 105-200,

12-14-35, P. Block 1	Oxygen Cylinder Replenishing

R **ON A/C ALL

12-33-21, P. Block 1	Ground Air Pre-Conditioning
35-11-11, P. Block 401	Oxygen Storage Cylinder Removal/Installation

3. Procedure

A. Recommendations

(1)General

(a)It is recommended to close the manual isolation valve of the oxygen cylinder(s) when aircraft is grounded for more than 4 hours and when temperature in avionics compartment falls below -15 deg.C (+5 deg.F).

1 Close valve of oxygen cylinder.

2 Bleed oxygen system :

- on panel 435VU, press OXYGEN/CREW/LO PR/SUPPLY pushbutton switch, OFF legend goes off.
- on one of the mask stowage boxes, move RESET TEST control slide several times to empty system.
- on panel 435VU, release OXYGEN/CREW/LO PR/SUPPLY pushbutton switch, OFF legend comes on.

(2)Installation of oxygen cylinder(s)

NOTE : When you replace oxygen cylinder(s), you must mandatorily obey the Removal/Installation procedure for oxygen cylinder(s) (Ref. 35-11-11, P. Block 401).

(a)If you replace the oxygen cylinder(s) of the crew oxygen system when the ambient temperature is -20 deg.C (-4 deg.F) or less :

- make sure that the temperature in the oxygen cylinder compartment is more than -20 deg.C (-4 deg.F). If this temperature is -20 deg.C (-4 deg.F) or less, the material (05-004) used to do the leak test will freeze.

(b)It is recommended to replace the cylinder after a flight but before the compartment temperature is -20 deg.C (-4 deg.F). Or you can do this task while you pre-condition the aircraft on the ground (Ref. 12-33-21, P. Block 1).

R **ON A/C 105-200,

R (3)Replenishment of oxygen cylinder(s)
(Ref. 12-14-35, P. Block 1)
NOTE : When you fill oxygen cylinder(s), you must mandatorilly obey the replenishment procedure for oxygen cylinder(s).
R (a)The maximum charging pressure of the cylinder changes with the ambient temperature. Be careful that the pressure at which you pressurize the cylinder is not more than the maximum charging pressure (Ref. 12-14-35, P. Block 1).
R (b)It is recommended to fill the cylinder before the temperature in the oxygen cylinder compartment is -20 deg.C (-4 deg.F) but only after :
- the aircraft network is de-energized,
- the aircraft and equipment are bonded to ground.

COLD WEATHER MAINTENANCE - WATER/WASTE

1. General

This procedure gives the cold weather maintenance practices for the water/waste systems.

Although an aircraft can stand very low ambient temperatures, the cabin air conditioning keeps the pipes and water systems sufficiently warm to prevent them from freezing. However, when the aircraft is not powered or remains on the ground at sub-zero temperatures, you must take additional precautions to prevent damage to the systems by ice.

NOTE : If the service panels or caps are frozen closed, do not use force to open or release them. You must apply hot air.

WARNING : MAKE SURE THAT THE WATER TANK IS DEPRESSURIZED.

WARNING : BEFORE YOU SUPPLY AIR FROM AN EXTERNAL SOURCE OR THE APU, MAKE CERTAIN THAT :
- AT LEAST ONE FLIGHT COMPARTMENT WINDOW OR CABIN DOOR IS OPEN AND THAT IS REMAINS OPEN DURING SERVICING.
- IF THE AIRCRAFT IS PARKED OUTSIDE AND IS NOT PROTECTED FROM THE RAIN ONE MAINTENANCE DOOR OR AVIONICS COMPARTMENT ACCESS DOOR IS OPEN AND THAT IS REMAINS OPEN DURING SERVICING.

CAUTION : MAKE SURE THAT THE DRAIN VALVES REMAIN OPEN AFTER YOU DRAIN THE POTABLE WATER SYSTEM IF :
- THE BLEED AIR SYSTEM IS "OFF" AND
- THE OUTSIDE AIR TEMPERATURE IS BELOW 0 DEG.C (32 DEG.F).
  THIS WILL PREVENT DAMAGE TO THE POTABLE WATER SYSTEM.

2. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 12-15-38, P. Block 1	Replenishing Potable Water
- 12-16-38, P. Block 1	Replenishing Toilets
- 12-24-38, P. Block 1	Potable Water System - Draining

4. Procedure

A. Pre-Flight (First Flight of the Day)
(Ref. 12-15-38, P. Block 1) (Ref. 12-24-38, P. Block 1)
(Ref. 12-16-38, P. Block 1)

(1)General
Ensure that all drain valves are closed.

(2)Potable water system
After draining due to low ambient temperatures you must fill the potable water system with warm water (30 deg.C (86 deg.F)) not earlier than 30 minutes before the engine start.

(3)Waste system
You must pre-charge the waste tanks not earlier than 30 minutes before the engine start.

(4)After filling, you must pressurize the water/waste systems and do a leak test of the fill/drain valves. You must remove excessive quantity of water around the service panels before you close them.

B. Post Flight (Last Flight of the Day but not Transit Stops)
(Ref. 12-24-38, P. Block 1)

(1)General

You must do the servicing of the potable water and waste water tanks as soon as possible after a flight. Read tables 1 and 2 (draining of the water/waste systems) to find if it is necessary to drain or not (depending on the ambient temperature and the cold soak period). Make sure that there are no residual fluids before you install the fill/drain caps. If you do not do this, the fluids can freeze immediately behind the fill/drain caps causing damages to the piping system and delays at the next servicing.

When the aircraft is parked at temperatures below 0 deg.C (32 deg.F), you can keep the service panels and the drain valves open to permit residual fluids to go out after the system has been drained.

TABLE 1

CONFIGURATION			COLD SOAK TIME (HOURS:MINS)	WATER AND WASTE TANKS DRAIN
AIR CONDITIONING	CABIN TEMPERATURE	OUTSIDE AIR TEMPERATURE		
ON	ABOVE 10 deg.C (50 deg.F)	BETWEEN 0 AND -15 deg.C (32 AND 5 deg.F)	ANY	NOT REQUIRED
		BELOW -15 deg.C (5 deg.F)	1:15	
OFF		BETWEEN 0 AND -7 deg.C (32 AND 19.4 deg.F)	1:30	REQUIRED
		BETWEEN -7 AND -15 deg.C (19.4 AND 5 deg.F)	0:30	
		BELOW -15 deg.C (5 deg.F)	ANY	

R (2)Addition of Anti-Freeze

R CAUTION : DO NOT USE ANTI-FREEZE THAT CONTAINS STOP-LEAK SOLUTIONS.

R NOTE :Propylene Glycol solutions are less toxic than Ethylene Glycol solutions, which are slow to biodegrade.

R (a)Automotive Anti-Freeze may be added to the toilet waste tank for additional protection.

R (b)Follow the manufacturers instructions for most effective protection. If no instructions are given, the following table should be used as a guide. The table is based on temperature of the contents of the tank, this temperature may differ from atmospheric temperature.

Percentage of Anti-Freeze reqd in tank	25%	33%	40%	50%
Ethylene Solution protection to	+10 deg F -12 deg C	0 deg F -18 deg C	-12 deg F -24 deg C	-34 deg F -37 deg C
Propylene solution protection to	+18 deg F -8 deg C	8 deg F -13 deg C	-5 deg F -21 deg C	-27 deg F -33 deg C

R (3)Potable water system

CAUTION : **IF THE APU OR ENGINE IS USED TO PRESSURIZE THE SYSTEM, DO NOT OPEN THE ELECTRICAL DRAIN VALVES FOR LONGER THAN NECESSARY TO PURGE RESIDUAL WATER IN ORDER TO AVOID WATER TANK QUANTITY TRANSMITTER DAMAGE THROUGH EXPOSURE TO HOT BLEED AIR.**

(a)In specially cold climates, you must drain then purge the potable water system. Pressurize and ventilate the system to remove residual water. Do the procedure given below :

- check that water shut off (s/o) valves in lavatories and galleys are open
- pull to **DRAIN** position the servicing panel handle and check that drain valve is open (light **ON**).
  If the light is **OFF**, open it manually.
- close electrical drain valves on both panels after drainage.
- start **APU** and pressurize potable water system.
- drain water out of boilers and coffee makers (up to 4 liters may come out of each boiler).
  Meanwhile, do three toilet flushings in each toilet and press several times wash basin faucets (bear in mind that toilets are inoperative with waste servicing door open)
- after completion of the above, re-open the potable water electrical drain valves drain toilet waste tank to remove residual water from pipes
- during the winter season, leave the service panels and the drain valves open and do not install the **FILL/DRAIN** caps.

(b)If you cannot drain the potable water system, you must heat the aircraft with an external or internal source as follows :

TABLE 2

OUTSIDE AIR TEMPERATURE	EXTERNAL HEAT SOURCE	APU	SUPERVISOR	DRAINING OF WATER SYSTEM
0 deg.C (32 deg.F) to -5 deg.C (23 deg.F)	1 HOUR EVERY 4 HOURS	NO	NO	NO
-5 deg.C (23 deg.F) to -10 deg.C (14 deg.F)	2 HOURS EVERY 4 HOURS	NO	NO	NO
-10 deg.C (14 deg.F) to -15 deg.C (5 deg.F)	CONTINUOUS	NO	NO	NO
BELOW -15 deg.C (5 deg.F)	CONTINUOUS	AS REQUIRED	YES	YES

COLD WEATHER MAINTENANCE - AUXILIARY POWER UNIT

1. General

This procedure gives the cold weather maintenance practices for the Auxiliary Power Unit (APU).

NOTE : When ambient temperature is below -40 deg.C use TYPE ONE OIL (Mat. No. 03-002) in the APU.

2. Equipment and Materials

ITEM	DESIGNATION
A. Material No. 03-002	Oils (Ref. 20-31-00)
R B. A98101-08300	Adapter Heating APU

Referenced Procedures

- 12-31-21, P. Block 1	Cold Weather Maintenance - Air Conditioning
- 12-31-24, P. Block 1	Cold Weather Maintenance - Electrical Power

3. Procedure

A. Electronic Control Box (ECB)

If the ambient temperature becomes lower than -40 deg.C (-40 deg.F) and there is no heat on the aircraft and if the APU is not required for heating :

- remove the ECB from the aircraft,
- keep the ECB at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F).

(1)Ground power not available

If the APU is required preflight, it is recommended to start the APU every three hours and operate it for one hour if the Outside Air Temperature (OAT) is lower than -30 deg.C (-22.00 deg.F).

NOTE : These values are only applicable if all the access doors are closed.

B. APU Starting after a Cold Soak

(1)ECB

NOTE : Do not operate the ECB for more than 30 minutes at -40 deg.C (-40 deg.F).

(a)If the ECB was on the aircraft during the cold soak, make sure that the temperature of the ECB is higher than -40 deg.C (-40 deg.F). If the temperature of the ECB is lower than -40 deg.C (-40 deg.F), use a pre-conditioning procedure to increase the temperature of the ECB to a minimum of -40 deg.C (-40 deg.F) (Ref. 12-31-21, P. Block 1).

(b)If you removed the ECB from the aircraft and kept it at a temperature between 15 deg.C (59 deg.F) and 35 deg.C (95 deg.F), re-install the ECB.

(2)Batteries

To start the APU with the batteries, (Ref. 12-31-24, P. Block 1).

NOTE : You can start the APU with the two batteries if the OAT is higher than -15 deg.C (+5 deg.F) during the cold soak.

C. Turn-Around Time

For turn-around in cold weather conditions, when it is not practical to remove equipment, it is recommended to keep the APU in operation.
In this configuration :

- the temperature in the cabin will not decrease,
- no specific cold weather maintenance practices are necessary for the APU system.

COLD WEATHER MAINTENANCE - STRUCTURE

1. General

This procedure gives the cold weather maintenance practices for the structure.

2. Equipment and Materials

Referenced Procedures

- 51-80-00, P. Block 701 — Airframe Drainage
- 53-10-33, P. Block 401 — Aft Cargo Compartment Floor Panels

3. Procedure

A. General

R CAUTION : ICE ACCUMULATION WILL HAPPEN WHEN THE AIRCRAFT FLIES BETWEEN
R DESTINATIONS WITH OUTSIDE AIR TEMPERATURES BELOW 0 DEG.C
R (32 DEG.F).

R (1)Make sure that the drain valves in the lower fuselage are clean and
R operate correctly (Ref. 51-80-00, P. Block 701).
R (2)Ice can collect in the lower fuselage areas when the aircraft flies from
R warm, humid climates to cold climates. In some conditions, the ice can
R collect during more than one flight.
R NOTE : Water/ice in the lower fuselage can cause failure of the radio
R altimeter.
R (3)When you do a check for ice in the lower fuselage, look for ice in the
R aft area before you look in the forward area. Ice usually collects more
R easily in the aft area than in the forward area. Water evaporation is
R faster in the forward area because of the warm air from the avionics
R compartment.

R B. Check for Ice

R (1)Remove a floor panel from the forward end of the aft cargo compartment.
R (Ref. 53-10-33, P. Block 401).
R (2)Look for ice in the lower fuselage.
R (3)If you find ice below the aft cargo compartment, look for ice below the
R forward cargo compartment.
R (4)Install the floor panel (Ref. 53-10-33, P. Block 401).

R C. Removal of Ice

R CAUTION : IT IS HIGHLY RECOMMENDED TO REMOVE THE ICE IN A WARM HANGER
R BECAUSE ICE ACCUMULATION WILL HAPPEN THROUGHOUT THE WHOLE
R FUSELAGE. A HOT AIR BLOWER WILL ONLY BE ABLE TO MELT THE ICE
R PARTLY AND ONLY IF OUTSIDE AIR TEMPERATURES ARE MODERATELY COLD.
R (1)Warm hanger
R Put the aircraft in a warm hangar with the cargo compartment doors open.
R This will cause all the ice in the aircraft to melt and the water will
R flow out through the drain valves.
R (2)Hot air blower
R CAUTION : MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE HOT AIR
R BLOWER IS NOT MORE THAN 50 DEG.C (122 DEG.F).

R IF THE TEMPERATURE IS MORE THAN 50 DEG.C (122 DEG.F) YOU CAN
R CAUSE DAMAGE TO THE AIRCRAFT.
R You can use a hot air blower if the aircraft is parked in an open area.
R (3)Frequency of ice removal
R (a)Determine the frequency of ice removel on the basis of 350 FH
R (Flight Hours) Check.
R 1 Place suitable container underneath the fuselage drain valves to
R collect the melted ice.
R 2 Measure the quantity of drain water
R -if the quantity is less than 200kg the inspection interval can
R be doubled.
R -if the quantity is more than 200kg the inspection interval must
R be halfed.
R D. Monitoring of Ice Removel Procedure
R (1)The procedure used to remove ice from the lower fuselage must be
R monitored to make sure that all the water drains are working correctly
R and all ice is removed.

COLD WEATHER MAINTENANCE-DOORS

1. General

This procedure gives the cold weather maintenance practices for the door system.

2. Equipment and Materials

ITEM	DESIGNATION
(1)Material No. 04-011	Common Greases (Ref. 20-31-00)
(2)Material No. 04-012	Common Greases (Ref. 20-31-00)
(3)Material No. 04-017	Common Greases (Ref. 20-31-00)
(4)Material No. 05-001	Special Materials (Ref. 20-31-00)
(5)Material No. 15-005A	Storage Preservation (Ref. 20-31-00)

3. Procedure

A. Winter Preparation

(1)Passenger/crew doors and emergency exits

(a)Make sure that the passenger/crew doors and emergency exits pressure seal drains are clear and free from obstruction, i.e. not plugged with sealant or debris.

(b)Clean dirt and old lubricant from the door guide rollers, roller fittings and upper and lower door guide fittings and clean door-to-fuselage contact areas.

(c)Apply common grease (Material No. 04-017) to the door guide rollers, roller fittings to upper and lower guide fittings. Make sure that the door drain holes are clear and unobstructed.

(d)Clean dirt and old lubricant from the door pressure seals of the passenger/crew doors and door-to-fuselage contact area and apply special materials (Material No. 05-001) to the pressure seals.

(e)Apply a coat of Material No. 15-005A to all visible interior surfaces and structure of the passenger/crew doors. Lubricate the passenger/crew door outer handle assembly and apply storage preservation Material No. 15-005A.

NOTE: Do not apply storage preservation (Material No. 15-005A) to the outer handle grip.

(f)Clean dirt and old lubricant from the pressure seal of the overwing emergency exit and the exit-to fuselage contact area using a cleaning cloth and aplly special materials (Material No. 15-005A).

(g)Clean dirt and old lubricant from the upper and lower door guide rollers and door guide fittings of the overwing emergency exit using a cleaning cloth.

(h)Apply common grease (Material No. 04-017) to the upper and lower door guide rollers and door guide fittings. Make sure that the door drain holes are clear and unobstructed.

(j)Apply common grease (Material No. 04-017) to the locking pin of emergency escape slide release mechanism.

R (k)Apply common grease (Material No. 04-017) to the hinge arm locking

R mechanism including the connection rod to the black pushbottom of
R passenger doors.
(l)Clean old lubricant from the operating mechanism of the exit and apply storage preservation (Material No. 15-005A).
(2)Bulk cargo and lower cargo doors
(a)Clean dirt and hold lubricant from the bulk cargo and cargo door pressure seals and apply a coat of Material No. 05-001 and Material No. 04-011.
(b)Make sure that the bulk cargo and cargo door pressure seal drains are clear and free from obstruction i.e. not plugged with sealant or debris.
(c)Clean dirt and old lubricant from the lower cargo door vent panel seals and apply a coat of Material No. 05-001, Material No. 04-012 or Material No. 04-011.
(d)Clean all external operating handles and apply Material No. 15-005A to the external handle and shaft.
(e)Lubricate the door hinges and guide fittings, apply Material No. 15-005A to the latch assemblies and latch spools.
(f)Remove the cargo door linings and lubricate the internal operating
R mechanisms (lock shaft, operating handle and latch assemblies).
(g)Lubricate the door hinges and guide fittings. Spray the lower interior bay of the door with Material No. 15-005A.
(h)Install the cargo door linings.

B. Passenger/Crew Doors and Emergency Exits (Before Flight)
Make sure that snow or slush is removed from the door frame contact area and pressure seal before you close the door.

C. Bulk Cargo and Lower Cargo Doors (Before Flight)
(1)You must clear the cargo pallets and containers of as much snow and/or water as practicable before loading onto the aircraft. Large amounts of melting snow and water may lead to frozen doors. The loading crew should be made aware of the consequences and encouraged to clear the pallets/containers.
(2)You must keep the lower cargo doors closed until immediately prior to loading cargo and close them as soon as loading is complete. Although the loading of cargo compartments is not a maintenance action and cannot necessarily be influenced by maintenance or engineering personnel, the intervention should be made when considered necessary.
(3)If hangar space is available, it is recommended that the cargo doors are partially opened to a vertical position while the aircraft remains in the hangar. This action will help to remove any moisture that may be present within the door.
(4)You must apply hot air to any doors or panels that do freeze closed. Never chip ice away using hard or sharp instruments.

D. Passenger/Crew Doors and Emergency Exits (After Flight)
(1)Aircraft not parked in hangar
(a)Make sure that all snow or slush around the door frame contact area and pressure seal is removed before you close up the aircraft.
(b)Clean dirt and old lubricant from the passenger/crew door and emergency

exit seal and apply a coat of Material No. 05-001.

(c)Make sure that the passenger/crew door and emergency exit pressure seal drains are clear and free from obstruction, i.e. not plugged with sealant or debris.

(2)Aircraft parked in hangar

(a)It is recommended that the passenger/crew doors are opened while the aircraft remains in the hangar. This action will help to remove any moisture that may be present.

E. Bulk Cargo and Lower Cargo Doors (After Flight)

(1)Make sure that snow or slush is removed from the door frame contact area pressure seal before you close the door.

(2)If the aircraft departs on a flight from a station where the ambient temperature is more than 0 deg.C (32 deg.F) to a destination with an ambient temperature less than 0 deg.C (32 deg.F), you must spray Material No. 15-005A onto the operating mechanism and structure on the lower section of the cargo door. This action minimizes the effects of freezing condensation at cold airports.

(3)Maintenance (frequency may be increased if required by the operating environment).

(a)Clean dirt and old lubricant from the bulk cargo and cargo door pressure seals and apply a coat of Material No. 05-001 and Material No. 04-011.

(b)Make sure that the bulk cargo and cargo door pressure seal drains are clear and free from obstruction i.e. not plugged with sealant or debris.

(c)Clean dirt and old lubricant from the lower cargo door vent panel seals and apply a coat of Material No. 05-001, Material No. 04-012 or Material No. 04-011.

(d)Clean all external operating handles and apply Material No. 15-005A to the external handle and shaft.

(e)Lubricate the door hinges and guide fittings, apply Material No. 15-005A to the latch assemblies and latch spools.

F. Service Panels

(1)All the fuselage service panels and doors must have a light coat of Material No. 15-005A applied to the hinges and latch mechanisms.

COLD WEATHER MAINTENANCE - POWER PLANT

1. General
   This procedure gives the cold weather maintenance practices for the engines.

2. Procedure

   A. Ice can form in the engine intakes and freeze the fan, therefore you must do a careful examination of the engine intake and fan before engine start up.
   Attention must be paid to the forward and rear sides of the fan blades in order to determine whether clear ice is present.
   Use hot air blower to remove all traces of ice and residual water before engine start up.

R **ON A/C 101-200,

R CAUTION : MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE HOT AIR BLOWER
R IS NOT MORE THAN 121 deg.C (250 deg.F) WHEN APPLIED TO THE ENGINE
R OR NACELLE.

R **ON A/C ALL

   B. Freezing Points
      (1)The oil temperature is a limitation. For the approved oils and the oil limitation temperatures, you must refer to the Engine Manufacturer's data.

SAMPLING FOR ANALYSIS

1. General

This section deals with the various forms of fluid analysis which may be carried out.

It is subdivided into :

12-32-24 IDG Oil Sampling for Analysis

R 12-32-27 Flight Controls Oil Sampling for Analysis

12-32-28 Fuel Sampling for Analysis

12-32-29 Hydraulic Fluid

12-32-79 Engine Lubricating Oil.

SAMPLING OF THE IDG OIL FOR ANALYSIS

1. Reason for the Job

To find the cause of the oil contamination (skydrol, fuel, water, chlorine, oil degradation, and other causes).
The best place and time to take an oil sample is the case drain after an engine run, when the IDG oil has come up to the operating temperature (80 deg.C (176 deg.F)).

WARNING : BE CAREFUL WHEN YOU WORK ON THE ENGINE COMPONENTS IMMEDIATELY AFTER THE ENGINE IS SHUTDOWN. THE ENGINE COMPONENTS CAN STAY HOT FOR UP TO ONE HOUR.

WARNING : WEAR GOGGLES, INSULATED GLOVES AND OTHER PROTECTIVE CLOTHES. HOT OIL CAN BURN YOUR EYES AND SKIN.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 71-13-00, P. Block 301	Cowl Doors
(1)	Transparent bottle 0.5 US gallon (2 liters)
(2)	O-ring
(3)	Oil
(4)	Acryloid

3. Procedure

A. Job Set-Up

(1)Open safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	DISC/IDG1	3XT	206/D20
22VU	DISC/IDG2	4XT	206/D21

(2)Open safety and tag circuit breakers for the appropriate engine and open RH fan cowl door (Ref. 71-13-00, P. Block 301).
(Ref. Fig. 301)

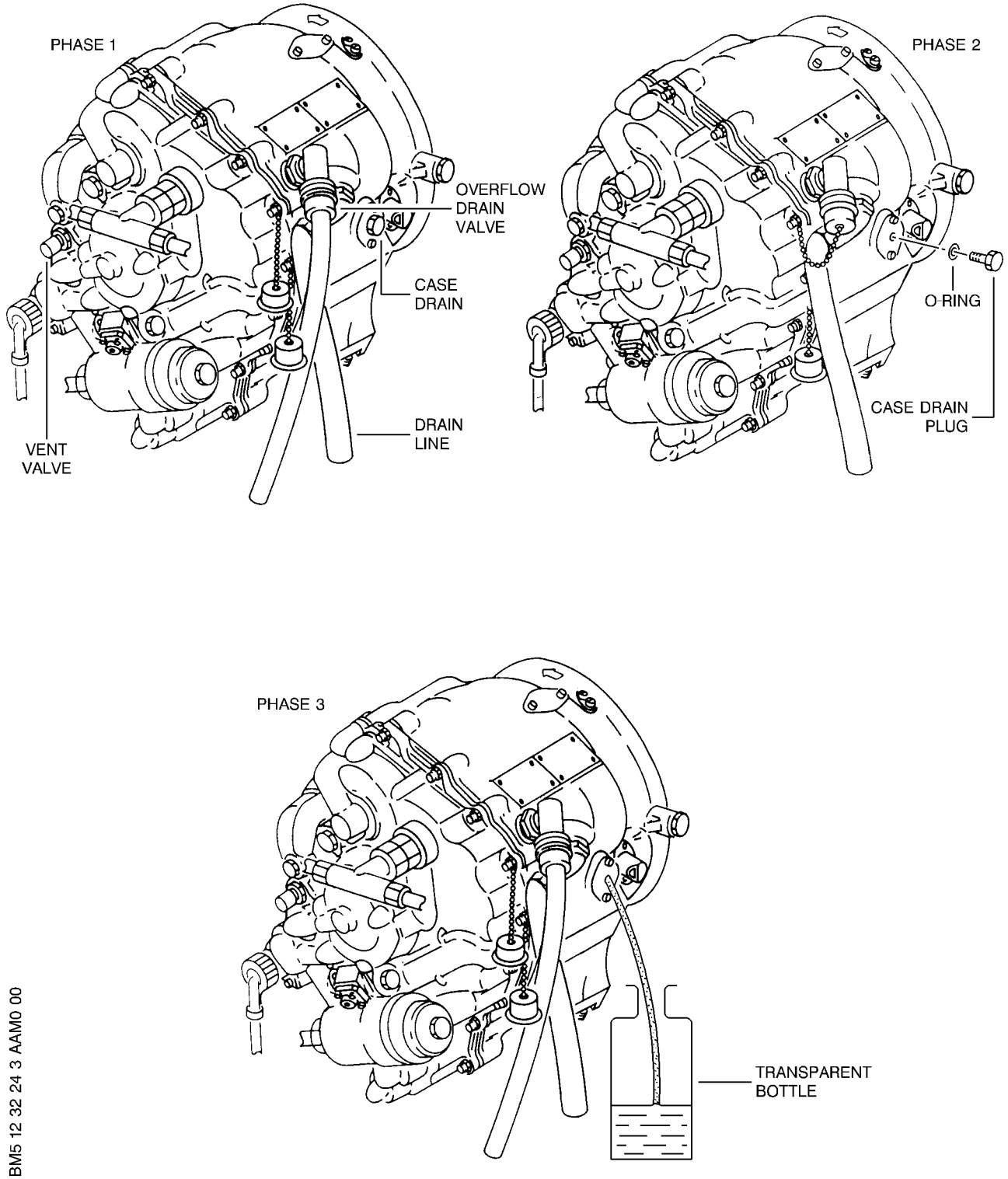
B. Sampling of the IDG Oil

(1)Depressurize IDG by connecting drain line to overflow drain valve or depressurize IDG by pressing the PUSH TO VENT valve (if still installed) for approximately 15 seconds.

(2)WARNING : WEAR GOGGLES WHEN REMOVING LOCKWIRE.
NOTE : Make sure the oil is not too hot.

(a)Cut lockwire and remove case drain plug and O-ring.

(b)Put a transparent bottle 0.5 US gallon (2 liters) below the case drain port.
The transparent bottle must be cleaned and sterilized.



Sampling of IDG Oil
Figure 301

(c)Slowly remove the case drain plug until oil flows from the case drain port.
Fill the transparent bottle with approximately 100 ml (0.26 USgal) of oil.
Seal the case drain port.
(d)Remove the O-ring from the case drain plug and discard it.
Install new O-ring, lubricated with Acryloid or oil, on drain plug.
(e)Install case drain plug in IDG case and TORQUE to between 55 lbf.in. and 75 lbf.in. (0.56 m.daN and 0.85 m.daN).
Safety case drain plug with lockwire.
(f)Remove overflow drain line from the overflow drain valve if installed.
Install case overflow plug.

C. Oil Sample Bottle
(1)The oil sample bottle must be sent to laboratory as soon as possible with these data :
(a)Oil sampling date.
(b)Type and brand of oil used.
(c)Operating time since last oil sampling.
(d)IDG total operating time.
(e)Identification of the IDG (Serial Number).
NOTE : If you do not do the analysis immediately, seal the bottle.

D. Servicing of the IDG
(1)Replenish IDG with oil (Ref. 12-13-24, P. Block 1).

E. Close-up
(1)Remove safety clips and tags and close circuit breakers 3XT and 4XT.
(2)Close RH fan cowl door (Ref. 71-13-00, P. Block 301).
Remove safety clips and tags and close circuit breakers for the appropriate engine.

FLIGHT CONTROL OIL SAMPLING FOR ANALYSIS

1. Reason for the Job

To check presence of water in flap and slat gearboxes.

NOTE : At sub zero temperatures as any water present in gearbox oil will go to ice.
This will increase operating torques - the greater the extended water ingress, the higher the system torques. Water ingress in jack head gearboxes could be the cause of a flap/slat jam.

2. Equipment and Materials

	ITEM	DESIGNATION
	A.	Syringe
	B. WTCG96-10000	Water Test Tool
R	C. 98A27503003000	Guard-Safety, Flap/Slat Control Lever
	D.	Access platform, 5.5 m (18 ft.)
	Referenced procedures	
	- 12-13-27, P. Block 001	Flight Controls
	- 29-10-00, P. Block 301	Main Hydraulic Power-Pressurization/ Depressurization

3. Procedure

A. Job Set-up

(1)Make sure that hydraulic systems are depressurized (Ref. 29-10-00, P. Block 301).

R (2)Install safety guard 98A27503003000 on flap/slat control lever.

(3)Position access platform.

B. Sampling

(1)Remove plug on gearbox.

(2)Take a sample of oil (approximately 10CC) using a syringe with a plastic pipe.

NOTE : If the unit has been operated within the last 1/2 hour, then the water (if any) will be emulsified with the oil. If the unit has been standing for more than 2 hours, then most of the water (if any) will have settled to the bottom.

(3)Using water test tool WTGC96-10000, determine the percentage of water present in the oil.

(a)If the amount of water is in excess of 5 per cent, then this could probably be a cause of jam. If water is present check for internal corrosion (if the oil is heavily contaminated with products of corrosion such as must particles it will be brown and muddy and would leave a considerable deposit on a filter paper.
Discoloured but clean oil, i.e. coca cola coloured, is satisfactory.

(b)Water in oil indicates a possible seal failure and is reason enough to replace the unit. However, the unit can be re-used temporarily if there is no significant internal corrosion and any 'water-contaminated' oil is replaced by fresh oil to MIL-H-5606D. The unit ought to be replaced when convenient.

(4)Complete oil level if necessary (Ref. 12-13-27, P. Block 001).
(5)Install plug on gearbox.
(6)**TORQUE** plug to the specified torque and safety with lockwire (Ref. 12-13-27, P. Block 001).

4. Close-up
A. Remove safety clips and tags and close circuit breakers.
B. Remove safety guard on flap/slat control lever.
C. Remove access platform.
D. Make sure that the area is clean and clear of tools and other items.

FUEL - SERVICING

WARNING : MAKE SURE THAT YOU HAVE THE CORRECT FIRE FIGHTING EQUIPMENT AVAILABLE.

OBEY THE FUEL SAFETY PROCEDURES IN 28-00-00, P. BLOCK 301.

WHEN SAMPLING, PREVENT CONTACT WITH DRAINED WATER AND/OR FUEL. IF DRAINED WATER AND/OR FUEL CONTACTS YOUR SKIN, WASH IT OFF WITH WATER. IF DRAINED WATER AND/OR FUEL PENETRATES AN OPEN CUT, WASH THOROUGHLY WITH WATER AND GET MEDICAL AID. IF EYES ARE CONTAMINATED, FLUSH EYES WITH WATER AND GET MEDICAL AID.

1. Control of Water in the Aircraft Fuel Tanks

A. Reason for the Job

- To examine for water in the aircraft fuel tanks.
- To drain water from the aircraft fuel tanks.
- To sample the fuel for microbiological contamination.

NOTE 1: These procedures are applicable if the outside air temperature is more than 0 deg C. If the outside air temperature is less
R than 0 deg C. and you cannot drain the fuel/water because of ice
R in the tanks, then do the cold weather maintenance procedures (Ref. 12-31-28, P. Block 201).

NOTE 2: If possible, do the examination for water in the aircraft fuel tanks before you refuel the aircraft. As an alternative, you must wait for a minimum of 30 minutes after a refuel has been completed before you do the examination for water or drain water from the aircraft fuel tanks.

NOTE 3: As an alternative, it is permitted to use the suction procedure Drainage of Residual Fuel (Ref. 28-25-00, P. Block 301) to fully drain the trim tank.

R **ON A/C 001-003,

R #### B. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 m - 7 m (6 ft - 20 ft)
B.	Fuel Container, Clear Glass, one liter (0.25 US gal)
C.	HYDROKIT (Use only for the water examination procedure)
D.	Hot Air Blower
E.	Warning Notices - NO SMOKING

ITEM	DESIGNATION
F. 98A28101000000	Adapting Pipe - Water Draining From Fuel
G. 98A28104000000	Purging Tool - Water Drain
Referenced Procedures	
- 12-11-28, P. Block 301	Replenishing of Fuel Tanks
- 12-31-28, P. Block 201	Cold Weather Maintenance
- 27-40-00, P. Block 1	Trimmable Horizontal Stabilizer
- 28-00-00, P. Block 301	Fuel - General
- 28-11-00, P. Block 501	Tanks - Adjustment/Test
- 28-11-21, P. Block 401	Water Drain Valves
- 28-11-32, P. Block 401	Water Drain Valves - Trim Tank
- 28-25-00, P. Block 301	Refuel/Defuel System

R **ON A/C 001-100,

R Post SB 28-2049 For A/C 001-003,

R B. Equipment and Materials

R ITEM	DESIGNATION
R A.	Access Platform 2 m - 7 m (6 ft - 20 ft)
R B.	Fuel Container, Clear Glass, one liter (0.25 US gal)
R C.	HYDROKIT (Use only for the water examination procedure)
R D.	Hot Air Blower
R E.	Warning Notices - NO SMOKING
R F. 98A28101000000	Adapting Pipe - Water Draining From Fuel
R G. 98A28104000000	Purging Tool - Water Drain
R Referenced Procedures	
R - 12-11-28, P. Block 301	Replenishing of Fuel Tanks
R - 12-31-28, P. Block 201	Cold Weather Maintenance
R - 27-40-00, P. Block 1	Trimmable Horizontal Stabilizer
R - 28-00-00, P. Block 301	Fuel - General
R - 28-11-00, P. Block 501	Tanks - Adjustment/Test
R - 28-11-21, P. Block 401	Water Drain Valves
R - 28-11-32, P. Block 401	Water Drain Valves - Trim Tank
R - 28-11-41, P. Block 501	Fuel Pump - Scavenge
R - 28-25-00, P. Block 301	Refuel/Defuel System

R **ON A/C 101-200,

R Post SB 28-2105 For A/C 101-200,

R B. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 m - 7 m (6 ft - 20 ft)
B.	Fuel Container, Clear Glass, one liter (0.25 US gal)
C.	HYDROKIT (Use only for the water examination procedure)
D.	Hot Air Blower
E.	Warning Notices - NO SMOKING
F. 98A28104000000	Purging Tool - Water Drain
G. 98A28108001000	Adaptor, Water Drain, ACT
H. 98A28108001040	Thrust Rod, Water Drain, ACT (Part of Adaptor PN98A28108001000)
J. 98A28108001206	Flange, Water Drain, ACT (Part of Adaptor PN98A28108001000)
Referenced Procedures	
- 12-11-28, P. Block 301	Replenishing of Fuel Tanks
- 12-31-28, P. Block 201	Cold Weather Maintenance
- 27-40-00, P. Block 1	Trimmable Horizontal Stabilizer
- 28-00-00, P. Block 301	Fuel - General
- 28-11-00, P. Block 501	Tanks - Adjustment/Test
- 28-11-21, P. Block 401	Water Drain Valves
- 28-11-32, P. Block 401	Water Drain Valves - Trim Tank
- 28-11-39, P. Block 401	Water Drain Valves - Additional Center Tanks
- 28-11-41, P. Block 501	Fuel Pump - Scavenge
- 28-25-00, P. Block 301	Refuel/Defuel System

R **ON A/C 101-200,

R B. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 m - 7 m (6 ft - 20 ft)
B.	Fuel Container, Clear Glass, 0.25 US gal (one liter)
C.	HYDROKIT (Use only for the water examination procedure)
D.	Hot Air Blower
E.	Warning Notices - NO SMOKING
F. 98A28104000000	Purging Tool - Water Drain
G. 98A28108001000	Adaptor, Water Drain, ACT
H. 98A28108001040	Thrust Rod, Water Drain, ACT (Part of Adaptor PN98A28108001000)
J. 98A28108001206	Flange, Water Drain, ACT (Part of Adaptor PN98A28108001000)
Referenced Procedures	
- 12-11-28, P. Block 301	Replenishing of Fuel Tanks
- 12-31-28, P. Block 201	Cold Weather Maintenance

ITEM	DESIGNATION
- 27-40-00, P. Block 1	Trimmable Horizontal Stabilizer
- 28-00-00, P. Block 301	Fuel - General
- 28-11-00, P. Block 501	Tanks - Adjustment/Test
- 28-11-21, P. Block 401	Water Drain Valves
- 28-11-32, P. Block 401	Water Drain Valves - Trim Tank
- 28-11-39, P. Block 401	Water Drain Valves - Additional Center Tanks
- 28-11-41, P. Block 501	Fuel Pump - Scavenge
- 28-25-00, P. Block 301	Refuel/Defuel System

**ON A/C ALL

C. Procedure
(Ref. Fig. 301)

**ON A/C 101-200,

(Ref. Fig. 302)

**ON A/C 101-103, 105-200,

Post SB 28-2105 For A/C 101-103,105-200,

(Ref. Fig. 303)

**ON A/C ALL

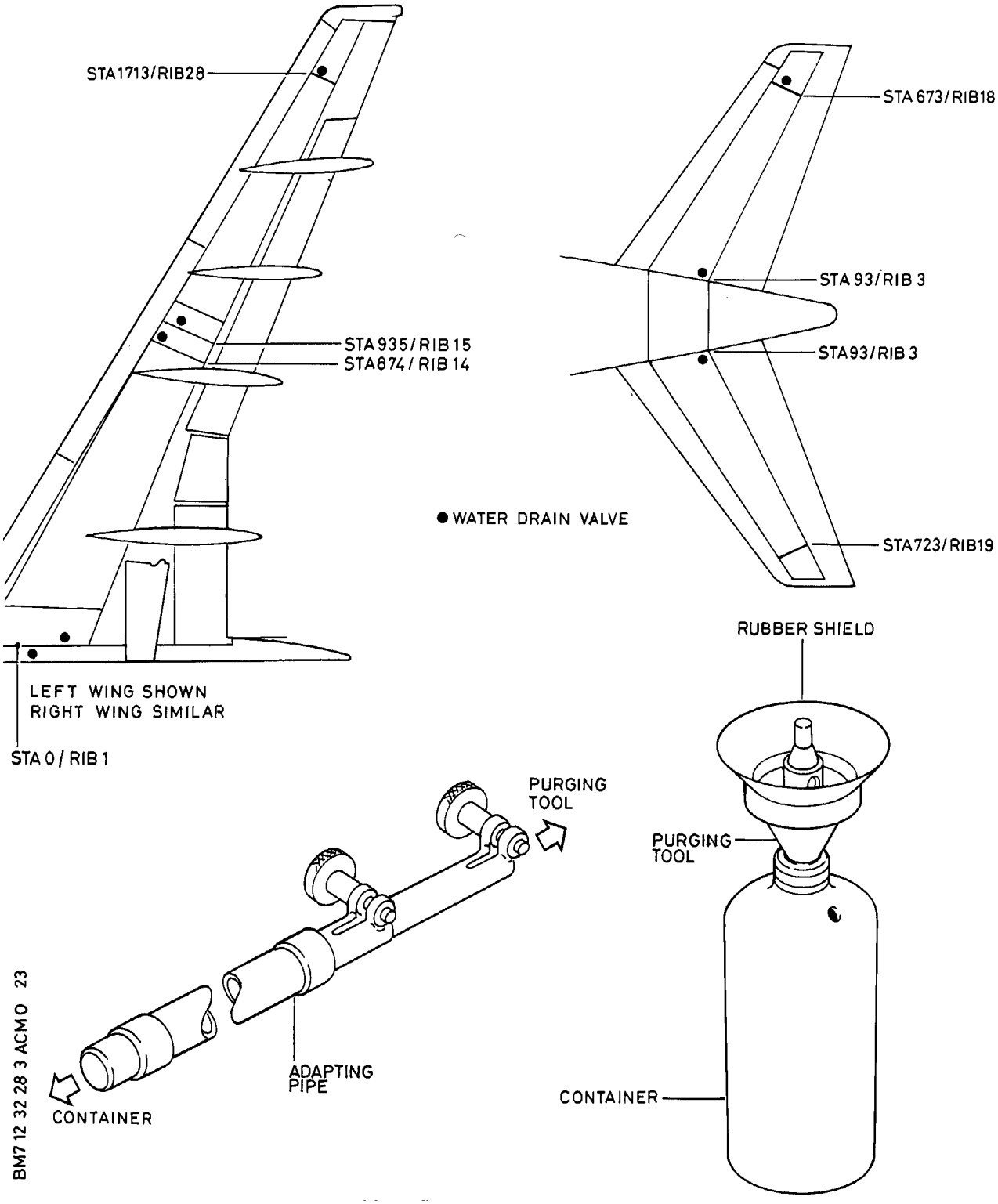
(1)Job Set-Up
(a)Before you take a sample from the fuel tank, make sure that each tank contains the minimum quantities of fuel that follow:

TANK	L OUTER	L INNER	CENTER	R INNER	R OUTER	TRIM
kg	300	700	700	700	300	700
lb	660	1543	1543	1543	660	1543

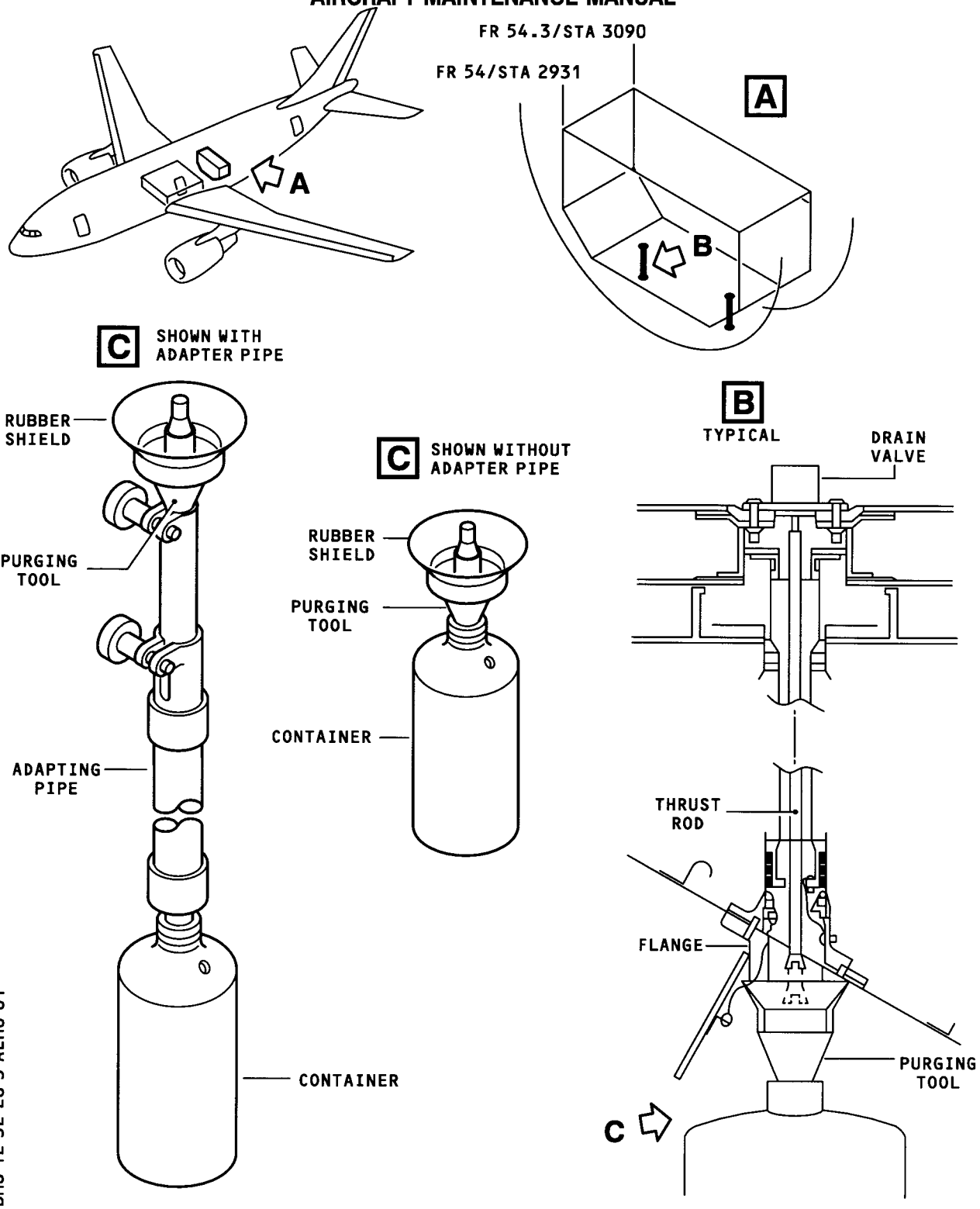
- If necessary, refuel or transfer fuel (Ref. 12-11-28 or 28-25-00, P. Block 301).

NOTE: This will make sure that the level of fuel is sufficient to force any water through the drain valves.

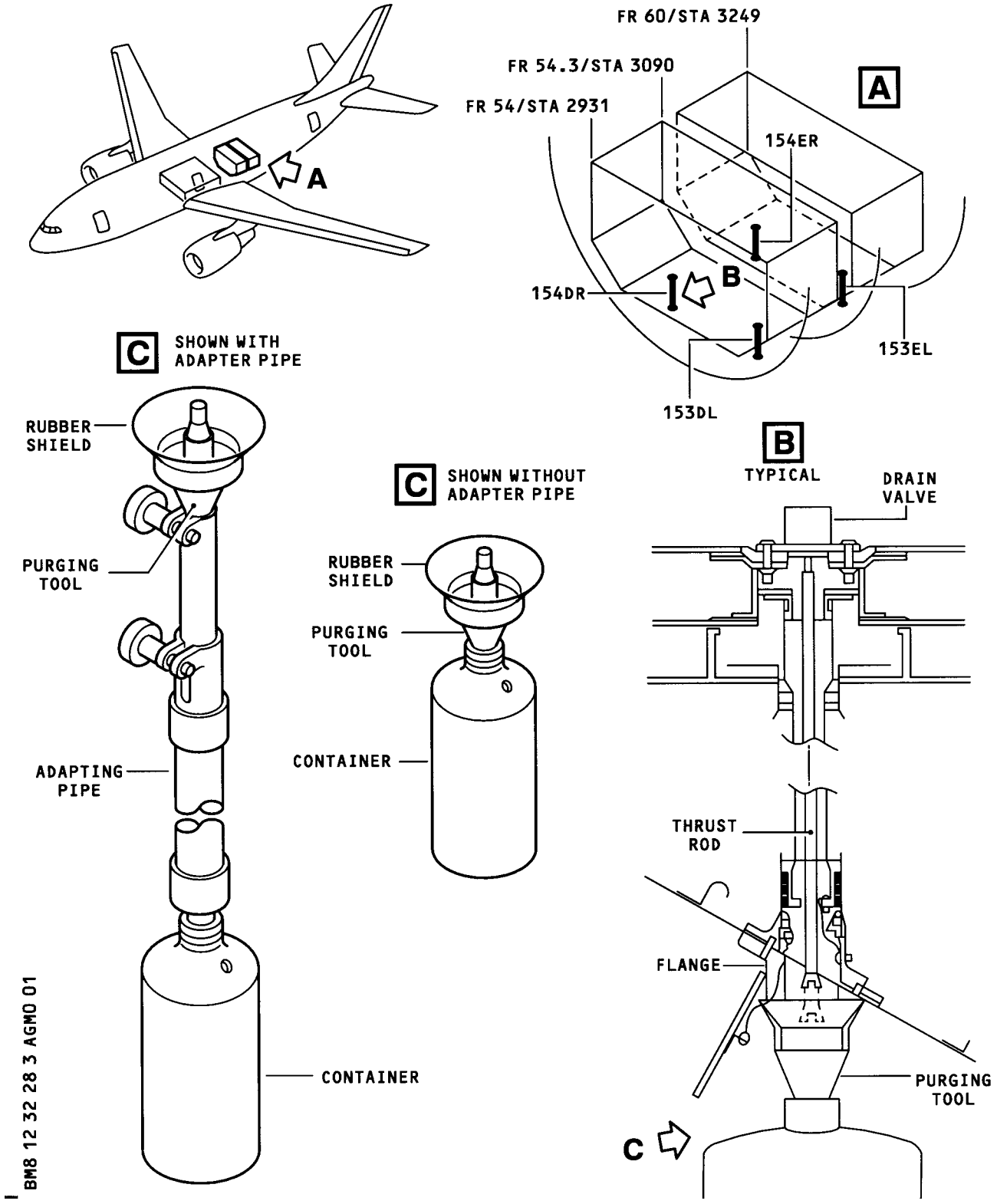
(b)Put the "NO SMOKING" notices over an area covering 10 m (33 ft) radius around the sample point.
(c)Make sure that the aircraft is statically grounded.
(d)Put the access platform in the applicable position.



Fuel Sampling - Equipment
Figure 301



Fuel Sampling Equipment - 1 ACT
Figure 302



Fuel Sampling Equipment - 2 ACT
Figure 303

(e)Set the Trimmable Horizontal Stabilizer (THS) to the 0 deg. position with the pitch-trim control-wheel (Ref. 27-40-00, P. Block 1).

(2)To examine for water in the Aircraft Fuel Tanks.

CAUTION: DO NOT APPLY VERY HIGH LOADS TO THE DRAIN VALVE. IF THE DRAIN VALVE DOES NOT OPEN EASILY, FIND THE CAUSE. THE DRAIN VALVE CAN BE FROZEN IN LOW TEMPERATURES, REFER TO THE COLD WEATHER MAINTENANCE PROCEDURES (REF. 12-31-28, P. BLOCK 201).

R **ON A/C 001-003,

R (a)Sampling from the wing tanks, the center tank and the trim tank.
R 1 Assemble the draining equipment as necessary:
R - purging tool PN 98A28104000000 to a clean, dry container
R - purging tool PN 98A28104000000 to adapting pipe PN 98A28101000000 to a clean, dry container.
R 2 Put the purging tool PN 98A28104000000 in position below the applicable drain valve.

R CAUTION : IF YOU FIND AN UNUSUALLY LARGE QUANTITY OF WATER DURING THE CENTER TANK DRAIN CHECKS, THEN:
R - DO THE FUNCTIONAL TEST - CENTER TANK WATER SCAVENGE SYSTEM (REF. 28-11-00, P. BLOCK 501).

R 3 Push the drain valve and drain approximately 1 liter (0.25 US Gals) of fuel (as a sample) from the drain valve.

R NOTE: The rubber shield on the purging tool prevents a fuel leakage.

R 4 Remove the container and the purging tool PN 98A28104000000. If necessary, remove the adapting pipe PN 98A28104000000 from the purging tool.
R 5 Examine the drain valve for leaks.
R 6 If the valve does leak, use the purging tool to push (in) and release (out) the center of the valve three or four times.
R No leaks are permitted.
R 7 If leakage still occurs then remove the primary poppet valve, clean it and then install it (Ref. 28-11-21, P. Block 401) or (Ref. 28-11-32, P. Block 401).

R **ON A/C ALL

R Post SB 28-2049 For A/C 001-003,

R (a)Sampling from the wing tanks, the center tank and the trim tank.
R 1 Assemble the draining equipment as necessary:
R - purging tool PN 98A28104000000 to a clean, dry container
R - purging tool PN 98A28104000000 to adapting pipe PN 98A28101000000 to a clean, dry container.
R 2 Put the purging tool PN 98A28104000000 in position below the

R applicable drain valve.

R CAUTION : IF YOU FIND AN UNUSUALLY LARGE QUANTITY OF WATER DURING THE
R CENTER TANK DRAIN CHECKS, THEN:
R - DO THE FUNCTIONAL TEST - CENTER TANK WATER SCAVENGE SYSTEM
R (REF. 28-11-00, P. BLOCK 501).

R CAUTION : IF YOU FIND AN UNUSUALLY LARGE QUANTITY OF WATER DURING THE
R TRIM TANK OR INNER TANKS DRAIN CHECKS, THEN:
R - DO THE OPERATIONAL TEST OF TRIM TANK AND INNER TANKS
R SCAVENGE FUEL PUMPS (REF. 28-11-41, P. BLOCK 501).
R THEN IF NECESSARY:
R - DO THE FUNCTIONAL TEST - INNER-TANK WATER SCAVENGE SYSTEM
R (REF. 28-11-00, P. BLOCK 501)
R - DO THE FUNCTIONAL TEST - TRIM-TANK WATER SCAVENGE SYSTEM
R (REF. 28-11-00, P. BLOCK 501).

R 3 Push the drain valve and drain approximately 1 liter (0.25 US Gals)
R of fuel (as a sample) from the drain valve.

R NOTE: The rubber shield on the purging tool prevents a fuel leakage.

R 4 Remove the container and the purging tool PN 98A28104000000. If
R necessary, remove the adapting pipe PN 98A28104000000 from the purging
R tool.
R 5 Examine the drain valve for leaks.
R 6 If the valve does leak, use the purging tool to push (in) and
R release (out) the center of the valve three or four times.
R No leaks are permitted.
R 7 If leakage still occurs then remove the primary poppet valve,
R clean it and then install it (Ref. 28-11-21, P. Block 401) or
R (Ref. 28-11-32, P. Block 401).

**ON A/C 101-103, 105-200,

Post SB 28-2105 For A/C 101-103,105-200,

(b)Sampling from the ACT(s) (if installed).
1 Assemble the draining equipment as necessary:
- purging tool PN 98A28104000000 to a clean, dry container
- purging tool PN 98A28104000000 to adaptor PN 98A28108001000 to a clean, dry container.
2 Open the applicable access panels 153DL (154DR) and 153EL (154ER), disconnect each safety cord and remove the access panels.
3 Connect the flange PN 98A28108001206 to the aircraft skin with the quick release fasteners.
4 Put the thrust rod PN 98A28108001040 through the flange PN 98A28108001206 into the water drain valve.
5 Connect the thrust rod PN 98A28108001040 to the purging tool

PN 98A28104000000 and position against the flange PN 98A28108001206.

6 Push the drain valve and drain approximately 1 liter (0.25 US gals) of fuel (as a sample) from the drain valve.

NOTE: The rubber shield on the purging tool prevents a fuel leakage.

7 Remove the container and the purging tool PN 98A28104000000.

8 Examine the drain valve for leaks.

9 If the valve does leak, use the purging tool to push (in) and release (out) the center of the valve three or four times. No leaks are permitted.

10 If leakage still occurs then remove the primary poppet valve, clean it and then install it (Ref. 28-11-21, P. Block 401) or (Ref. 29-11-32, P. Block 401) or (Ref. 28-11-39, P. Block 401) (if ACT(s) installed).

**ON A/C 101-200,

(b)Sampling from an ACT (if installed).

1 Assemble the draining equipment as necessary:
- purging tool PN 98A28104000000 to a clean, dry container
- purging tool PN 98A28104000000 to adaptor PN 98A28108001000 to a clean, dry container.

2 Open the applicable access panel 153DL (154DR), disconnect the safety cord and remove the access panel.

3 Connect the flange PN 98A28108001206 to the aircraft skin with the quick release fasteners.

4 Put the thrust rod PN 98A28108001040 through the flange PN 98A28108001206 into the water drain valve.

5 Connect the thrust rod PN 98A28108001040 to the purging tool PN 98A28104000000 and put in position against the flange PN 98A28108001206.

6 Push the drain valve and drain approximately 0.25 US gals (1 liter) of fuel (as a sample) from the drain valve.

NOTE: The rubber shield on the purging tool prevents a fuel leakage.

7 Remove the container and the purging tool PN 98A28104000000.

8 Examine the drain valve for leaks.

9 If the valve does leak, use the purging tool to push (in) and release (out) the center of the valve three or four times. No leaks are permitted.

10 If leakage still occurs then remove the primary poppet valve, clean it and then install it (Ref. 28-11-21, P. Block 401) or (Ref. 28-11-32, P. Block 401) or (Ref. 28-11-39, P. Block 401) (if the ACT is installed).

**ON A/C ALL

(3)Fuel/water contamination test.

(a)Put the sample into a transparent glass container. If you do not do the analysis immediately, seal the container.

(b)Let the sample become stable:

1 If the sample moves into two layers, it contains water. Do the water drain procedure in para. 1. C. (2) until all water is drained.

2 If the sample stays in one layer, it can be all fuel or all water.

3 To find if the sample is fuel or water, do the test that follows.

4 If the result of the test shows that the sample contains water, do the water drain procedure in Para. 1. C. (2) until all water is drained.

(c)Test.

WARNING : DO THE TEST ONLY IN AN APPROVED AREA.

ACTION	RESULT
1. If you have a hydrokit available, put the contents into the sample	- if the powder stays white, the sample is fuel and the test is complete - if the white powder changes color to purple, the sample is water. Continue to take samples and test until all the water has been removed.
2. If you do not have a hydrokit available, add water to the sample	- if the sample moves into two layers, the sample taken is all fuel and the test is complete - if the sample stays in one layer, the sample is water. Continue to take samples and test until all the water has been removed.

NOTE 1: You can use the same procedure to do an analysis on a sample from a fuel tanker. Remove the sample from the supply connector of the fuel tanker.

NOTE 2: To discard the water samples, refer to local regulations. If the sample is to be sent for analysis, make a list to tell the laboratory all known additives in the fuel sample. This allows the laboratory to follow local regulations and discard the sample safely.

(d)Do the test procedure again at each drain valve.

(4)Not Applicable.

(5)To drain water from the aircraft fuel tanks.

(a)Make sure that the water drain equipment is set-up correctly to examine for water in the aircraft fuel tanks (Ref. Paragraph 1.C. step (2)).
(b)Do the fuel/water contamination test (Ref. Paragraph 1.C. step (3)) to check for water in the fuel.
(c)Put the purging tool and container on the drain valve and drain until all water is removed. Do the sampling procedure again (Ref. Paragraph 1.C. step (2) and step (3) at regular intervals until water is not in the fuel samples.

(6)To sample the fuel for microbiological contamination.
(a)Drain a sample of approximately 1 liter (0.25 US gal) of fuel per tank.
(b)Do the test to sample the fuel for microbiological contamination in Para. 2. C.

**ON A/C 101-200,

(7)Close-Up
(a)Make sure that the work area is clean and clear of tools and other miscellaneous items of equipment.
(b)Connect the safety cords and install the access panels 153DL(154DR).
(c)Remove the flange PN 98A28108001206 and the thrust rod PN 98A28108001040 from the aircraft skin.
(d)Put the Trimmable Horizontal Stabilizer (THS) to the normal operating condition (Ref. 27-40-00, P. Block 301).
(e)Remove the access platform.
(f)Remove the warning notices.

**ON A/C 001-100,

(7)Close-Up
(a)Make sure that the work area is clean and clear of tools and other miscellaneous items of equipment.
(b)Connect the safety cords and install the access panels 153DL(154DR) or 153EL (154ER).
(c)If necessary, remove the adapting pipe PN 98A28101000000 from the purging tool PN 98A28104000000. Remove the flange PN 98A28108001206 and the thrust rod PN 98A28108001040 from the aircraft skin.
(d)Put the Trimmable Horizontal Stabilizer (THS) to the normal operating condition (Ref. 27-40-00, P. Block 301).
(e)Remove the access platform.
(f)Remove the warning notices.

**ON A/C ALL

2. To Sample the Fuel for Microbiological Contamination.

A. Reason for the Job

- The procedure lets you do a test of the sample locally or you can send it to a laboratory.
- Refer to the SIL 28-079 for more information about microbiological contamination in fuel tanks.

B. Equipment and Materials

ITEM	DESIGNATION
A.	Transperent fuel resistant plastic container(s), 2 liter (0.5 US gal)
B.	1 MICROBMONITOR 2 TEST KIT ECHA MICROBIOLOGY UK (CAGE CODE OHZY6)
C.	1 FUELSTAT RESINAE TEST KIT CONIDIA BIOSCIENCE UK (CAGE CODE KE 385)
D.	1 HY-LITE JET A1 FUEL TEST KIT MERCK KGAA, UK (CAGE CODE D2186)
E.	1 EASICULT COMBI TEST KIT ORION DIAGNOSTICA, FINLAND (CAGE CODE S4259)
Referenced Procedures	
- 28-00-00, P. Block 301	Fuel - General
- 28-11-00, P. Block 301	Tanks - Servicing

C. Procedure

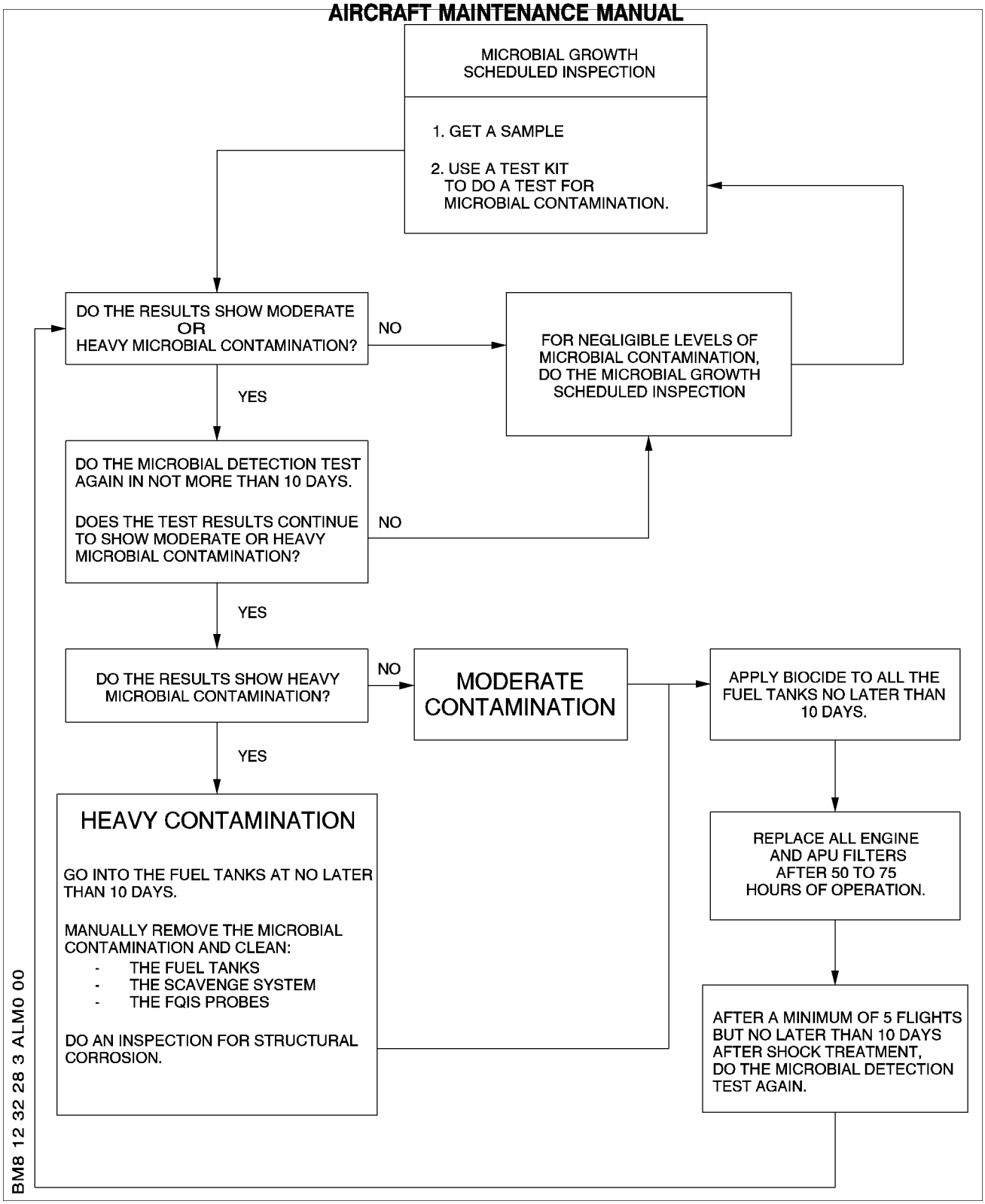
NOTE: If moderate or heavy microbiological contamination is found in the samples:
- all the fuel tanks may have microbiological contamination
- a biocidal shock treatment must be applied to all of the fuel tanks (Ref. 28-11-00, P. Block 301).

(Ref. Fig. 304)
(Ref. Fig. 305) (Sheet 1/3)
(Ref. Fig. 305) (Sheet 2/3)
(Ref. Fig. 305) (Sheet 3/3)

(1)Job Set-Up

WARNING: OBEY THE FUEL SAFETY PROCEDURES. THIS CAN PREVENT INJURY AND DAMAGE.

(a)Obey the fuel safety procedures (Ref. 28-00-00, P.Block 301).


MICROBIAL GROWTH SCHEDULED INSPECTION
1. GET A SAMPLE
2. USE A TEST KIT TO DO A TEST FOR MICROBIAL CONTAMINATION.
DO THE RESULTS SHOW MODERATE OR HEAVY MICROBIAL CONTAMINATION?
NO
FOR NEGLIGIBLE LEVELS OF MICROBIAL CONTAMINATION, DO THE MICROBIAL GROWTH SCHEDULED INSPECTION
YES
DO THE MICROBIAL DETECTION TEST AGAIN IN NOT MORE THAN 10 DAYS.
DOES THE TEST RESULTS CONTINUE TO SHOW MODERATE OR HEAVY MICROBIAL CONTAMINATION?
NO
YES
DO THE RESULTS SHOW HEAVY MICROBIAL CONTAMINATION?
NO
MODERATE CONTAMINATION
APPLY BIOCIDE TO ALL THE FUEL TANKS NO LATER THAN 10 DAYS.
YES
HEAVY CONTAMINATION
GO INTO THE FUEL TANKS AT NO LATER THAN 10 DAYS.
MANUALLY REMOVE THE MICROBIAL CONTAMINATION AND CLEAN:
- THE FUEL TANKS
- THE SCAVENGE SYSTEM
- THE FQIS PROBES
DO AN INSPECTION FOR STRUCTURAL CORROSION.
REPLACE ALL ENGINE AND APU FILTERS AFTER 50 TO 75 HOURS OF OPERATION.
AFTER A MINIMUM OF 5 FLIGHTS BUT NO LATER THAN 10 DAYS AFTER SHOCK TREATMENT, DO THE MICROBIAL DETECTION TEST AGAIN.
BM8 12 32 28 3 ALM0 00

Maintenance Plan Flowchart - Microbiological Contamination
Figure 304

BM8 12 32 28 3 ANMA 00

TEST KITS COMPARISON TABLE

TEST INFORMATION	CONVENTIONAL (CFU)			IMMUNOASSAY
	MICROB MONITOR	IP385	EASY CULT COMBI	FUELSTAT RESINAE
CAGE NO	OHZY6		S4259	KE 385
FUEL	YES	YES	NO	YES
WATER	YES	YES	YES	YES
MEASURED PARAMETER	QUANTITIVE ASSESSMENT OF CFU	QUANTITIVE ASSESSMENT OF CFU	QUANTITIVE ASSESSMENT OF CFU	ASSESSES NEGLIGIBLE, MODERATE AND HEAVY LEVELS OF A COMPOUND ASSOCIATED WITH THE GROWTH OF H.RESINAE
ASSESSMENT METHOD	COUNT NUMBER OF COLONIES (OR COMPARE CHART)	COUNT NUMBER OF COLONIES	ASSESS NUMBER OF COLONIES	VISUAL OBSERVATION OF TEST AND CONTROL LINES ON TEST PADDLE
FUEL AND WATER COMPATABILITY	YES	FUEL (CAN BE MODIFIED FOR WATER)	YES	YES
DIRECT/INDIRECT TEST FOR FUEL	DIRECT	DIRECT	DIRECT	USE AQUEOUS EXTRACT
TIME FOR RESULT	1 TO 4 DAYS (HEAVY) UP TO 6 DAYS IF NOT INCUBATED (28-30°)	3 TO 5 DAYS	2-5 DAYS	10 MINUTES
SUITABILITY FOR FIELD USE	YES	NO LABORATORY ONLY	YES	YES
TRANSPORT RESTRICTIONS	NONE	NOT APPLICABLE	NONE	NONE

(CONTINUED ON SHEET 2)

Microbiological Contamination Test Kits - Comparison Table
Figure 305

BM8 12 32 28 3 ANMJ 00

TEST KITS COMPARISON TABLE (CONTINUED FROM SHEET 1)

TEST INFORMATION	ATP
	HY-LITE JET A1 FUEL TEST
CAGE NO	D2186
FUEL	YES
WATER	YES
MEASURED PARAMETER	QUANTITIVE ASSESSMENT OF ATP
ASSESSMENT METHOD	NUMERICAL INSTRUMENT READING
FUEL AND WATER COMPATABILITY	YES (MANUFACTURER RECOMMENDS TESTING BOTH PHASES TOGETHER)
DIRECT/INDIRECT TEST FOR FUEL	USE AQUEOUS EXTRACT
TIME FOR RESULT	LESS THAN 10 MINUTES
SUITABILITY FOR FIELD USE	YES
TRANSPORT RESTRICTIONS	NONE

TEST INFORMATION	CONVENTIONAL (CFU)	
	MICROB MONITOR	IP385
SHELF LIFE/CONDITIONS	1 YEAR (AMBIENT) 2 YEARS (REFRIGERATED)	NOT APPLICABLE
DEFECTS — BACTERIA	YES	YES
DEFECTS — SRB AND OTHER ANAEROBES	NO	ONLY WITH MODIFICATION TO PROTOCOL
DEFECTS — YEASTS	YES	YES
DEFECTS — ALL MOULDS	YES	YES
DEFECTS — H.RESINAE	YES	YES
DEFECTS — MOULD MYCELIUM	YES	YES
DEFECTS — MOULD SPORES	YES	YES
*CAN BE USED TO VALIDATE EFFECTIVE BIOCIDE TREATMENT WHEN BIOCIDE FUEL HAS BEEN BURNT	YES	YES
SAMPLING	CLEAN BOTTLE AND EQUIPMENT	CLEAN BOTTLE AND EQUIPMENT
SPECIAL DISPOSAL	IN DISINFECTANT	NOT APPLICABLE

(CONTINUED ON SHEET 3)

Microbiological Contamination Test Kits - Comparison Table
Figure 305

BM8 12 32 28 3 ANMS 00

TEST KITS COMPARISON TABLE (CONTINUED FROM SHEET 2)

TEST INFORMATION	CONVENTIONAL (CFU)	IMMUNOASSAY	ATP
	EASY CULT COMBI	FUELSTAT RESINAE	HY-LITE JET A1 FUEL TEST
SHELF LIFE/CONDITIONS	9 MONTHS (AMBIENT)	18 MONTHS (AMBIENT)	1 YEAR (REFRIGERATED)
DEFECTS — BACTERIA	YES	NO	YES
DEFECTS — SRB AND OTHER ANAEROBES	YES	NO	YES
DEFECTS — YEASTS	YES	NO	YES
DEFECTS — ALL MOULDS	YES	NO	YES
DEFECTS — H.RESINAE	YES	YES	YES
DEFECTS — MOULD MYCELIUM	YES	YES (H.RESINAE ONLY)	YES
DEFECTS — MOULD SPORES	YES	NO	NO
*CAN BE USED TO VALIDATE EFFECTIVE BIOCIDE TREATMENT WHEN BIOCIDE FUEL HAS BEEN BURNT	YES	YES MAY SHOW POSITIVE RESULT FOR CONTAMINATION FOR UP TO 3 DAYS AFTER TREATMENT IF FUEL IS NOT BURNT	YES A SPECIAL PROTOCOL MAY BE NEEDED IN CERTAIN CASES
SAMPLING	CLEAN BOTTLE AND EQUIPMENT	CLEAN BOTTLE AND EQUIPMENT	CLEAN BOTTLE AND EQUIPMENT
SPECIAL DISPOSAL	IN DISINFECTANT	NONE	NONE

* BASED ON EVALUATION OF SUBMITTED TECHNICAL DATA

Microbiological Contamination Test Kits - Comparison Table
Figure 305

(b)Drain a fuel and water sample from each fuel tank (Ref. Para. 1. C. (a)). You must use a different sample container for each fuel tank.

NOTE: Do not put additives in the samples to show the water contents.

NOTE: Before you collect the samples, read the manafacturers instructions in the test kit. Make sure you use a sample container that is specified and is clean and dry before use. An incorrect, dirty sample container can give an unwanted effect to the results.

(c)Put the sample(s) into a transparent fuel resistant plastic container(s) with a minimum capacity of 1.0 Liter (0.2641 USgal) and:
- seal the container(s)
- make sure you can see the free water and fuel in the sample(s) (for the **MICROBMONITOR2** kit or the **FUELSTAT RESINAE** kit).

(d)Identify each sample with a label that shows:
- the aircraft number
- the time and date of the sample
- the fuel tank the sample came from
- all additives you know about.

(e)Keep the sealed sample containers in a cool protected area.

NOTE: After the test samples are collected, microbiological contamination in the sample could multiply or die. It is recommended that samples are tested before 6 hours, but no later than 24 hours.
AIRBUS recommends that the samples are tested in no more than 6 hours.

NOTE: Choose one microbial test kit for the complete procedure. Do not compare results between the microbial detection kits. They use different methods to give results. If you need help, ask the kit manufacturer.

(2)Sample Test - **MICROBMONITOR2** Test Kit Procedure.

(a)Do one of the steps that follow:
- Use the **MICROBMONITOR 2 TEST KIT ECHA MICROBIOLOGY UK (CAGE CODE OHZY6)** (and the manafacturers instructions) do a test on the **WATER** and **FUEL** samples,

OR
- Send the **WATER** and **FUEL** samples to an approved laboratory. They will use the Institute of Petroleum Procedure **IP 385** to provide the levels of fuel contamination.

(b)Do a check of the results:

NOTE: If you only do one test, it can give you an incorrect indication of the fuel tanks. If a test shows contamination, (moderate or heavy) do the test again, (in not more than 10 days) before you remove the aircraft from service.

Use the same test kit for the second test.

1 Negligible contamination:
a The contamination is negligible if:
- the **WATER** sample contents has 1000 CFU/milli liter (Colony forming Units) or less.
- the **FUEL** sample contents has 4000 CFU/Liter or less.

b Continue to monitor the fuel tanks at the scheduled inspection interval.

c This procedure is now complete.

2 Moderate contamination:
a The contamination is moderate if the:
- **WATER** sample contents has between 1000 and 10000 CFU/milli liter
- **FUEL** sample contents has between 4000 and 20000 CFU/Liter.

b Use the same method and do the sample test again in not more than 10 days after the first test.

c If the contamination has not changed from moderate:
- do the **BIOBOR** or **KATHON** biocidol shock treatment (moderate contamination procedure) to all of the fuel tanks, (Ref. 28-11-00, P. Block 301).

3 Heavy contamination:
a The contamination is heavy if the:
- **WATER** sample contents has more than 10000 CFU/milli liter
- **FUEL** sample contents has more than 20000 CFU/Liter.

b Use the same method and do the sample test again in not more than 10 days after the first test.

c If the contamination has not changed from heavy:
- do the **BIOBOR** or **KATHON** biocidol shock treatment (heavy contamination procedure) to all of the fuel tanks (Ref. 28-11-00, P. Block 301).

NOTE: When you do the heavy contamination procedure, you will need to enter the applicable fuel tanks to remove the contamination (Ref. 28-11-00, P. Block 301).

(c)The **MICROBMONITOR2** Test kit procedure is now complete, go to the close-up.

(3)Sample Test - **FUELSTAT RESINAE** Test-Kit procedure.

NOTE: The **FUELSTAT RESINAE** test-kit shows the most frequent type of contamination you can find in fuel tanks (Hormoniconis Resinae).
Other types of contamination will not be shown.

(a)Do one of the steps that follow:
- Use the **FUELSTAT RESINAE TEST-KIT CONDIA BIOSCIENCE UK (CAGE** code **KE385)** and the manafacturers instructions to do a test on the **WATER** and **FUEL** samples,

OR
- send the WATER and FUEL samples to an approved laboratory.

(b)Do a check of the results:

NOTE: If you only do one test, it can give you an incorrect indication of the fuel tanks. If a test shows contamination (moderate or heavy) do the test again (in not more than 10 days) before you remove the aircraft from service. Use the same test kit for the second test.

1 Negligible contamination:
a The contamination is negligible if the indication lines (on the test kit) show a low positive result.
b Continue to monitor the fuel tanks at the scheduled inspection interval.
c This procedure is now complete.

2 Moderate contamination:
a The contamination is moderate if the indication lines (on the test kit) show a low positive result.
b use the same method and do the sample test again in not more than 10 days after the first test.
c If the contamination has not changed from moderate:
- do the **BIOBOR** or **KATHON** biocidol shock treatment (moderate contamination procedure) to all of the fuel tanks. (Ref. 28-11-00, P. Block 301).

3 Heavy contamination:
a The contamination is heavy if the indication lines (on the test kit) show a high positive result.
b Use the same method and do the sample test again in not more than 10 days after the first test.
c If the contamination has not changed from heavy:
- do the **BIOBOR** or **KATHON** biocidol shock treatment (heavy contamination procedure) to all of the fuel tanks (Ref. 28-11-00, P. block 301).

NOTE: When you do the heavy contamination procedure, you will need to enter the applicable fuel tanks to remove the contamination (Ref. 28-11-00, P. Block 301).

(c)The **FUELSTAT RESINAE** Test-kit procedure is now complete go to the close-up.

(4)Sample Test - **HY-LITE** Jet A1 **FUEL** Test-Kit Procedure.

NOTE: The manafacturers recommend that you only use a fuel resistant transparent plastic sample container. Glass containers will give an unwanted effect to the operation of the test kit. If possible, do the test in a clean area.

(a)Do one of the steps that follow:
- Use the HY-LITE JET A1 Fuel Test-Kit MERCK KGAA, GERMANY (CAGE code D2186) and the manafacturers instructions to do a test on the WATER and FUEL samples,

OR

- send the WATER and FUEL samples to an approved laboratory.

(b)Do a check of the results:

NOTE: If you only do one test, it can give you an incorrect indication of the fuel tanks. If a test shows contamination, (moderate or heavy) do the test again (in not more than 10 days) before you remove the aircraft from service. Use the same test kit for the second test.

1 Negligible contamination:
- a The contamination is negligible if:
  - the WATER/FUEL sample contents has 1000 RLU/Liter (Relative Light Units) or less.
- b Continue to monitor the fuel tanks at the scheduled inspection interval.
- c This procedure is now complete.

2 Moderate contamination:
- a The contamination is moderate if:
  - the WATER/FUEL sample contents has between 1000 and 5000 RLU/Liter.
- b Use the same method and do the sample test again in not more than 10 days after first test.
- c If the contamination has not changed from moderate:
  - do the BIOBOR or KATHON biocidol shock treatment (moderate contamination procedure) to all of the fuel tanks, (Ref. TASK 28-11-00, P. Block 301).

3 Heavy contamination:
- a The contamination is heavy if:
  - the WATER/FUEL sample contents has between 1000 and 5000 RLU/liter.
- b Use the same method and do the sample test again in not more than 10 days after first test.
- c If the contamination has not changed from heavy:
  - do the BIOBOR or KATHON biocidol shock treatment (heavy contamination procedure) to all of the fuel tanks (Ref. 28-11-00, P. block 301).

NOTE: When you do the heavy contamination procedure, you will need to enter the applicable fuel tanks to remove the contamination (Ref. 28-11-00, P. Block 301).

(5)Close-Up
(a)Make sure that the work area is clean and clear of tools and

other items of equipment.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Hydraulic Fluid Contamination Detection

A. Reason for the Job

(1)To get samples of the hydraulic fluid for analysis and to make sure that the contamination of the aircraft hydraulic fluid stays in the
R limits of the NSA307110 specification.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.60 m (8 ft. 6 in.)
Referenced Procedures	
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 12-36-29, P. Block 1	Hydraulics

C. Fluid Monitoring

(1)Fluid monitoring shall be achieved basically by frequent sampling and particle counting, and by inspection of filter clogging indicators.

(2)Filters

Whenever filter clogging is indicated, the associated system shall be shut down, the clogged filter element replaced, a sample of the system hydraulic fluid taken for analysis and, depending on the results, the hydraulic fluid in the system reclaimed.

D. General Instructions Concerning Hydraulic Ground Power Carts

Only carts equipped with a fluid reservoir shall be submitted to contamination rate monitoring by means of fluid sampling.
All carts shall have a trailer card with a record of sample analysis results.

E. Permitted Contamination of Hydraulic Fluid

(1)Take samples of hydraulic fluid from Green, Blue and Yellow hydraulic systems (Ref. Para. 3. Hydraulic Fluid Sampling).

(2)Correct operation of hydraulic equipment requires a degree of cleanliness of the hydraulic fluid such that the number of particles contained in 100 cm^3 (6 cu.in.) of fluid does not exceed the class 9 requirements
R of NSA307110 specification.
The degree of cleanliness of the hydraulic fluid used for replenishing, topping up etc., hydraulic systems (cart reservoirs), must be consistent
R with class 7 of the NSA307110 specification (initial state).

R The degree of cleanliness of the hydraulic fluid contained in the
R hydraulic ground power unit must be consistent with class 9 of
R NSA307110 specification.
R (3)Reference list of maximum limits of class 7 and class 9 of NSA307110
R specification :

PARTICLE SIZE	NUMBER OF PARTICLES	
	CLASS 7	CLASS 9
5 to 15µ	32000	128000
15 to 25µ	5700	22800
25 to 50µ	1012	4050
50 to 100µ	180	720
> 100µ	32	128

(4)If the sample analysis gives a contamination rate more than one or more of the class 9 values :
(a)Stop the hydraulic tests.
(b)Clean the hydraulic fluid in the aircraft systems or reclaim the hydraulic fluid or change it (Ref. 12-36-29, P. Block 1).

2. Hydraulic Fluid Property In-Service Limits

A. Reason for the Job
(1)To check that hydraulic fluid properties are within in-service limits including additional temporary authorizations.

B. Procedure
(1)Take samples of hydraulic fluid from Green, Blue and Yellow hydraulic systems as per paragraph 3 of this topic. Send the bottles of hydraulic fluid to the sample analysis department.
NOTE : The values given below represent the level of contamination allowed for a limited time. The allowed time is the additional time the aircraft can remain into service from discovery of the contamination up to availability of new results (including corrective action, new sample removal and new analysis).

(2)Chemical analysis.
(a)Visual appearance : transparent
(b)Absolute kinematic viscosity
- Measured using UBBELOHDE type capillary viscometers at a temperature
R of 37.8°C (100°F).
R - Viscosity : 6 to 12.5 centiStokes.
R - Viscosity : 5.5 to 6 centiStokes (allowed time : 10 calendar days or 150 flight hours).
- Measurements are taken in a bath thermostatically controlled to within ± 0.5°C (0.9°F), the temperature being measured with a thermometer with accuracy of ± 0.5°C (0.9°F).
(c)Density
- Measured at a temperature comprised between 20 and 26°C (68 and 79°F).
R Density : 970 to 1066 kg/m³ (60.56 to 66.55 lbs/cu.ft) (allowed time : next A-check).
R
(d)Water content
R - Measured using the KARL FISCHER electro-chemical method.
R - Measured by titration using a mixture of solvents (chloroform + methanol in a ratio of 4 : 1) lightly hydrated at 5 mg of H^2O/cm^3 (0.00018 lbs/cu.in.).
R - Maximum water content : 0.80 % by weight (0.50 % max recommended).
R - 0.80 % to 1 % by weight (allowed time : next A-check).
R - 1 % to 1.5 % by weight (allowed time : 7 calendar days).
(e)Neutralization
- Measurement of acid or alkali constituents by potentiometric titration.
- Value obtained :
R - 1.5 mg KOH per g of fluid max
R - 1.5 mg to 2.5 mg KOH per g of fluid (allowed time : 7 calendar days).
(f)Chlorine content
- Using the colorimetric titration method in compliance with the

NSA307110 specification.
- Value obtained :

R - 200 ppm max
R - 200 to 300 ppm (allowed time : 10 calendar days or 150 flight hours).

(g)Electrical conductivity
Conductivity :

R - 0.30 microSiemens/cm minimum
R - lower than 0.30 microSiemens/cm minimum (allowed time : next A-check).

The method consists in measuring the resistance of a cell immersed in the hydraulic fluid using a conductivity bridge.
The resistivity is calculated using the formula :

$$\text{Resistivity} = R \frac{S}{L} = K.R.$$

Where R = Resistance in ohms
S = Surface area of electrodes cm^2
L = Gape between electrodes in cm
K = Cell constant in cm = S/L

$$\text{Conductivity} = \frac{1}{\text{Resistivity}}$$

Conductivity is measured under the following conditions :
- Cell constant, K is between 0.7 and 1.2 cm (0.28 and 0.47 in.)
- Frequency, F = 50 Hz
- Temperature = 23 ± 3°C (73.4 ± 5.4°F)

(3)Hydraulic fluid out of in-service limits.
(a)If the water or chlorine content of the fluid sample are equal to or more than the values given above :
- clean the hydraulic system fluid with PALL purifier (Ref. 12-36-29, P. Block 1)
- or replace the hydraulic fluid (Ref. 12-36-29, P. Block 1).

(b)If the acidity, density, viscosity or conductivity of the fluid sample are out the permitted values given above :
- replace the hydraulic fluid (Ref. 12-36-29, P. Block 1).

3. Hydraulic Fluid Sampling

NOTE : The following sampling procedure is applicable for the Green, Blue and Yellow systems.

A. Reason for the Job

(1)Fluid sampling to ascertain the degree of contamination of the three systems.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Fluid Container
(2)	Sampling Bottle and Protective Bag
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure

(Ref. Fig. 001)

(1)Job set-up

(a)Pressurize Green, Blue and Yellow systems (Ref. 29-10-00, P. Block 301).
Maintain sufficient pressure to allow fluid to flow through the systems and to be under pressure when drawn off for sampling.

(b)Open LH main gear door (Ref. 32-12-11, P. Block 301).

(2)Procedure

(a)Prepare sampling bottle and position fluid container under sampling valve.

NOTE : To sample the hydraulic fluid, you must use a glass bottle or a plastic bottle made exclusively with polyethylene.

(b)Remove protective cap from valve.

(c)Open sampling valve by engaging cap flange notch on needle valve collar and using it as a lever.

R (d)Flush valve by allowing 0.2 l (0.052 USgal) of fluid to drain off into a container.

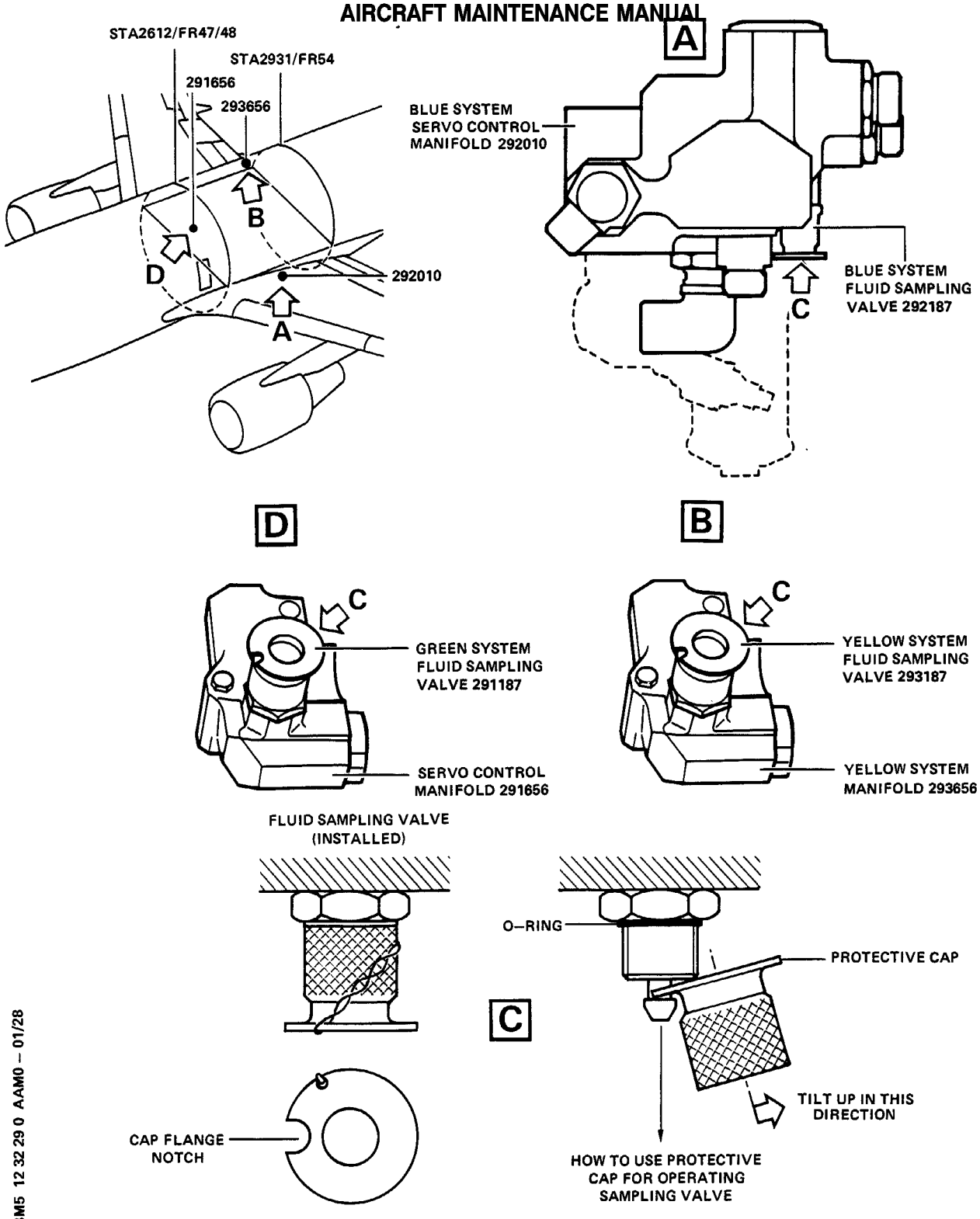
NOTE : Once the sampling valve has been cleaned and flushed, it must not be touched again during the sampling operation.
In the event of repeated sampling, the valve shall be flushed each time by allowing the same quantity to drain off into
R container, i.e. 0.2 l (0.052 USgal).

(e)Screw off sampling bottle cap and hold bottle under fluid flow until
R fluid drawn off reaches level of reference mark, i.e. the 0.2 l
R (0.052 USgal) level.

NOTE : Do not use sampled fluid to rinse out the bottle.

R (f)Withdraw and carefully close bottle.

R NOTE : To avoid sample contamination, do not wipe drops on sampling



Fluid Sampling Valves - Location
Figure 001

R valve and on sampling bottle.

(g)Close sampling valve.

(3)Close-up

(a)Put bottle containing sample fluid into the protective bag; dispatch bag to the sample analysis department.

(b)Install and wirelock sampling valve protective cap.

(c)Shut down hydraulic power (Ref. 29-10-00, P. Block 301).

(d)Check fluid level in hydraulic reservoirs and replenish as required (Ref. 12-12-29, P. Block 1).

(e)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

(f)Close LH main gear door (Ref. 32-12-11, P. Block 301).

ENGINE LUBRICATING OIL - SAMPLING METHOD

1. General

Engine oil sampling can be performed in order to :
- Detect evidence of fuel in engine oil
- Follow up wear of engine lube wetted parts, by Spectrometric Oil Analysis Procedure (SOAP).

Evidence of fuel in engine oil indicates leaks in the fuel/oil heat exchanger and requires exchanger replacement and drain, flush and service of lube system. The recommended detection methods to be used are : Flash point and viscosity.

Spectrometric Oil Analysis Procedure yields warning information on wear of engine lube wetted mechanical parts prior to part failure. The method is based on analysis of submicroparticles suspended in engine oil using a direct reading spectrometer with automatic concentration computation.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Plastic Tube 50 cm (19.685 in.) Long
B.	Bottle 20 ml (1.220 cu. in.) (SOAP) 150 ml (9.153 cu. in.) Fuel Detection
C.	Identification Label (See Below)
D.	Mailing Case
E. 98A12001017000	Tank-Engine Oil Filling Up (Portable Type)
Referenced Procedure	
- 12-13-79, P. Block 1	Engines (Engine Oil System)

NOTE : Sampling material must have no chemical action on oil and fuel and must be sterile.

3. Procedure

NOTE : Oil sample must be taken within 30 minutes following engine shut down.

A. Job Set-Up

Open oil fill access door.

B. Drawing off an oil sample

WARNING : **WAIT AT LEAST FIVE MINUTES AFTER ENGINE SHUT DOWN BEFORE REMOVING OIL CAP TO ALLOW TANK PRESSURE TO BLEED OFF. HOT OIL GUSHING FROM TANK COULD CAUSE SEVERE BURNS.**

(1)Remove the oil tank filler cap. Note the dipstick indication.

(2)Prior to any replenishing, insert plastic tube into the oil tank until tube strikes the bottom of the oil tank filler cap strainer. Withdraw tube approximately 1/2" from bottom of strainer to provide free draw of oil into tube.

(3)Draw off oil from tank into bottle by siphoning or squeezing and releasing bottle when plastic bottle with sealed tube is used.
Oil quantity to be taken : 15 cm^3 (0.915 cu. in.) for SOAP

150 cm³ (9.153 cu. in.) for fuel evidence detection.

NOTE : When plastic bottle is squeezed, slowly release bottle in order to avoid drawing oil with particles from bottom of oil tank.

(4)Cap bottle. Discard plastic tube after each sampling

NOTE : It is important to use new tube with each oil sample extracted to assure sample is representative of oil condition.

Top up engine lube system if necessary (Ref. 12-13-79).

Record oil sample added for oil consumption monitoring.

Position and lock the filler cap. Make certain it is closed properly by pulling it upwards.

(5)Correct accurate data is essential. Note the following on the bottle label :

A/C Registration number

Engine S/N

Date of sampling

Engine hours

Oil adds since last sample

(6)Additional information is required to assure sample identification and analysis results record prior to dispatch to the laboratory.

NOTE : Timely dispatch is required to yield usable analysis results.

C. Close-Up

Close access door.

4. Oil Contamination by Fuel. Acceptable Limits

Oil sample taken from tank will be submitted to a laboratory for analysis by one or all of the following methods :

Method		Acceptable Limit
A. Flash point	(a) ASTM D92-57	340°F (171°C) & higher
	(b) SETA Flash	340°F (171°C) & higher
B. Viscosity ASTM D445		35 % increase from actual measured new oil viscosity At 100°F (37,8°C)

ENGINE LUBRICATING OIL - SAMPLING METHOD

1. General

Engine oil sampling can be performed in order to :
- Detect evidence of fuel in engine oil
- Follow up wear of engine lube wetted parts, by Spectrometric Oil Analysis Procedure (SOAP).

Evidence of fuel in engine oil indicates leaks in the fuel/oil heat exchanger and requires exchanger replacement and drain, flush and service of lube system. The recommended detection methods to be used are : Flash point and viscosity.

Spectrometric Oil Analysis Procedure yields warning information on wear of engine lube wetted mechanical parts prior to part failure. The method is based on analysis of submicroparticles suspended in engine oil using a direct reading spectrometer with automatic concentration computation.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Plastic Tube 50 cm (19.685 in.) Long
B.	Bottle 20 ml (1.220 cu. in.) (SOAP) 150 ml (9.153 cu. in.) Fuel Detection
C.	Identification Label (See Below)
D.	Mailing Case
E. 98A12001017000	Tank-Engine Oil Filling Up (Portable Type)
Referenced Procedure	
R - 12-13-79, P. Block 1	Engine Lubricating Oil

NOTE : Sampling material must have no chemical action on oil and fuel and must be sterile.

3. Procedure

NOTE : Oil sample must be taken within 30 minutes following engine shut down.

A. Job Set-Up

Open oil fill access door.

B. Drawing off an oil sample

WARNING : WAIT AT LEAST FIVE MINUTES AFTER ENGINE SHUT DOWN BEFORE REMOVING OIL CAP TO ALLOW TANK PRESSURE TO BLEED OFF. HOT OIL GUSHING FROM TANK COULD CAUSE SEVERE BURNS.

(1)Remove the oil tank filler cap. Note the dipstick indication.

(2)Prior to any replenishing, insert plastic tube into the oil tank until tube strikes the bottom of the oil tank filler cap strainer. Withdraw tube approximately 1/2" from bottom of strainer to provide free draw of oil into tube.

(3)Draw off oil from tank into bottle by siphoning or squeezing and releasing bottle when plastic bottle with sealed tube is used.
Oil quantity to be taken : 15 cm^3 (0.915 cu. in.) for SOAP

150 cm³ (9.153 cu. in.) for fuel evidence detection.

NOTE : When plastic bottle is squeezed, slowly release bottle in order to avoid drawing oil with particles from bottom of oil tank.

(4)Cap bottle. Discard plastic tube after each sampling

NOTE : It is important to use new tube with each oil sample extracted to assure sample is representative of oil condition.

R Top up engine lube system if necessary (Ref. 12-13-79, P. Block 1).
Record oil sample added for oil consumption monitoring.
Position and lock the filler cap. Make certain it is closed properly by pulling it upwards.

(5)Correct accurate data is essential. Note the following on the bottle label :
A/C Registration number
Engine S/N
Date of sampling
Engine hours
Oil adds since last sample

(6)Additional information is required to assure sample identification and analysis results record prior to dispatch to the laboratory.

NOTE : Timely dispatch is required to yield usable analysis results.

C. Close-Up
Close access door.

4. Oil Contamination by Fuel. Acceptable Limits
Oil sample taken from tank will be submitted to a laboratory for analysis by one or all of the following methods :

Method		Acceptable Limit
A. Flash point	(a) ASTM D92-57	340°F (171°C) & higher
	(b) SETA Flash	340°F (171°C) & higher
B. Viscosity ASTM D445		35 % increase from actual measured new oil viscosity At 100°F (37,8°C)

PRE-CONDITIONING

1. General

The aircraft can be pre-conditioned on ground using : (Ref. 12-33-21)

- a ground air pre-conditioning unit.
- the air conditioning packs ; in this case the air is supplied by a HP ground air supply unit or by the APU.

GROUND AIR PRE-CONDITIONING

R **WARNING : BEFORE SUPPLYING AIR BY EXTERNAL SOURCE OR APU MAKE CERTAIN THAT :**
- **AT LEAST ONE FLT COMPT WINDOW OR CABIN DOOR IS OPEN AND REMAINS OPEN DURING SERVICING.**
- **IF THE A/C IS PARKED OUTSIDE AND IS NOT PROTECTED FROM THE RAIN, ONE MAINTENANCE DOOR SUCH AS 134AR, 136AR, OR AVIONICS ACCESS DOOR 121BL IS OPEN AND REMAINS OPEN DURING SERVICING.**

1. Pre-Conditioning Using LP Ground Connector

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Ground Air Pre-Conditioning Unit with the Following Characteristics - Airflow = 2.2 kg/s (4.85 lb/s)max. - Outlet pressure = 23 mb (0.33 psi)max. - Refrigerating power = 66,000 frigorie/h (76,000 Joule/s) (260,000 Btu/h)
(2)	Access Platform 2.15 m (7 ft.)
(3)	Warning Notice

B. Procedure

(1) Job set-up

(a) Position access platform.

(b) Open access door 135AL.

CAUTION : MAKE SURE THAT THE GROUND AIR-SUPPLY UNIT IS NOT TOO NEAR THE AIRCRAFT AND THAT THE ENGINE EXHAUST PIPE OF THE GROUND AIR-SUPPLY UNIT POINTS AWAY FROM THE AIRCRAFT. HEAT FROM THIS UNIT AND FROM THE EXHAUST CAN CAUSE DAMAGE TO THE AIRCRAFT STRUCTURE.

(c) Connect ground air pre-conditioning unit to LP ground connector.

(d) Put a warning notice on FLT COMPT WINDOW, CABIN DOOR or MAINTENANCE DOOR to tell persons that the door must remain open to prevent accidental pressurization.

NOTE : When the aircraft is supplied by external LP air, air conditioning supply from the packs should not be used simultaneously, and packs should subsequently be switched OFF.

(2) Pre-conditioning

(a) Start up ground air pre-conditioning unit.

(b) On ground air pre-conditioning unit, select the desired cooling or heating air temperature.

(3) Close-up

(a) Shut down ground air pre-conditioning unit.

(b) Disconnect ground air pre-conditioning unit from LP ground connector.

(c) Close access door.

(d) Remove warning notice.

(e) Remove access platform and ground air pre-conditioning unit.

2. Pre-Conditioning Using the Refrigeration Unit Pack

NOTE : The refrigeration unit packs are supplied by the HP ground air supply unit(s) or by the APU.

A. Equipment and Materials

ITEM	DESIGNATION
(1)	HP Ground Air Supply Unit with the Following Characteristics : Pressure = 3.1 to 3.4 bars (45 to 50 psi) Temperature = 180 to 230°C (355° to 445°F) Airflow = 2.02 to 2.2 kg/s (4.2 to 4.8 lb/s)
(2)	Warning Notice
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 49-00-00, P. Block 501	Airborne Auxiliary Power

B. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

(c)Put a warning notice on **FLT COMPT WINDOW, CABIN DOOR** or **MAINTENANCE DOOR** to tell persons that the door must remain open to prevent accidental pressurization.

(d)Make certain that overhead panel circuit breakers are closed, particularly those associated with **VENT, COMPT TEMP, AIR BLEED, VENTILATION, AIR BLEED & COMPT TEMP, CABIN PRESS, ECAM.**

(e)Make certain that **ENG1** and **ENG2** throttle control levers are in idle position.

(f)On **PACK TEMP** panel **441VU**

- check that **PACK 1** and **PACK 2 MODE SEL** pushbutton switches are pressed (in) **(AUTO).**

(g)On **COMPT TEMP** panel **437VU**

- check that **PACK VALVE 1** and **2** pushbutton switches are pressed (in)
- check that all temperature selectors are in **AUTO** position **(COLD** or **HOT** according to desired temperature)
- check that **HOT AIR SUPPLY** pushbutton switch is pressed (in).

(h)On **CABIN PRESS** panel **432VU**

- check that **OUTFLOW VALVES FWD** and **AFT** pushbutton switches are pressed (in).
  (both outflow valves open).

(2)Pre-conditioning

(a)Pressurize pneumatic system

1 Air supply by **APU** :

- start up **APU** (Ref. 49-00-00, P. Block 501)

On **AIR BLEED** panel **436VU**

- place **APU BLEED** switch in **ON** position (flowbar on **APU BLEED** annunciator comes on).
- check that **X FEED** valve position pushbutton switch flowbar is in line.

On COMPT TEMP panel 437VU
- check that flowbars on PACK VALVE 1 and PACK VALVE 2 pushbutton switches are on.

On AIR BLEED page (R ECAM display unit)
- check that pack discharge temperature and turbine inlet temperature indications are normal

2 Air supply by HP ground air supply unit :

CAUTION : THE GROUND SUPPLY UNIT SUPPLIES AIR TO THE AIR CONDITIONING PACKS, USE ONLY IF THE AIR SUPPLY IS CONFIRMED TO BE FREE FROM AIR CONTAMINATION.

- connect HP ground air supply unit(s) to HP ground connectors.

NOTE : When the aircraft is pressurized with the HP ground air supply unit and when the right refrigeration unit pack is operative, open the crossfeed valve as follows :

On AIR BLEED section of panel 436VU
- release X FEED mode pushbutton switch (MAN legend on)
- press X FEED valve position pushbutton switch (flowbar in line).

(b)On COMPT TEMP panel 437VU
- press PACK VALVE 1 (2) pushbutton switch
- check that FAULT legend on associated PACK VALVE 1 (2) annunciator comes on during opening of pack flow control valves, then goes off.
- On AIR BLEED page (R ECAM display unit)
  . check that pack discharge and turbine inlet temperature indications are normal.

(3)Close-up

(a)On COMPT TEMP panel 437VU
- release PACK VALVE 1 (2) pushbutton switch (OFF legend comes on and flowbar goes off).

(b)Shut down air supply

1 Air supply by APU
- place APU BLEED switch in OFF/R position (flowbar on APU BLEED annunciator is off)
- shut down APU (Ref. 49.00.00, P. Block 501).

2 Air supply by HP ground air supply unit.

On AIR BLEED panel 436VU
- release X FEED valve position pushbutton switch (flowbar crossline)
- press X FEED mode pushbutton switch (MAN legend off).
- Shut down and disconnect HP ground air supply unit.

(c)Remove warning notice.

(d)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(e)Restore system and aircraft to normal operating condition.

SYSTEM LINE FLUSHING

1. General

Flushing of a system line containing a fluid consists in removing all foreign matters, such as fuel, oil, water, dust, solvent, etc from that fluid.

The fluid involved may be used again only if its characteristics are in accordance with the specifications in force.

The topic covered in this section is :

12-36-29 HYDRAULICS

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Reason for the Job
This topic describes following procedures :

A. Flushing of hydraulic lines on aircraft in the event of damage to an engine pump (Ref. Para. 2.)

B. Flushing of hydraulic lines of pump without using a hydraulic ground power cart (Ref. Para. 3.)

C. Cleaning of hydraulic system fluid using a PALL purifier (Ref. Para. 4) :
- fluid cleaning when chemical analysis (without acid number check) is
R equal to on higher than the values of the NSA307110 (Ref. 12-32-29, P. Block 1).

D. Cleaning of hydraulic fluid in aircraft systems when the rate of particular contamination is higher than one or more of the class 9 values as stated in 12-32-29, P. Block 1 (Ref. Para. 5)

E. Replacement of hydraulic fluid :
(1)Replacement of hydraulic fluid in Green system with aircraft jacked and using a ground power cart (Ref. Para. 6.A.)
- replacement by repeated operations, of hydraulic fluid in Green system when the rate of contamination is higher than allowed value (Ref. 12-32-29, P. Block 1), so as to obtain a mixture containing approximately 80 % of new fluid.

(2)Replacement of hydraulic fluid in Green system (aircraft on its wheels and without ground power cart) (Ref. Para. 6.B.) :
- replacement of fluid by repeated operations when the rate of contamination is higher than allowed value (Ref. 12-32-29, P. Block 1). This procedure permits to replace approximately 70 % of the Green hydraulic fluid.

NOTE : In order to obtain optimum efficiency, perform this procedure in two stages at one-week operation interval.

(3)Replacement of hydraulic fluid in Blue or Yellow system (Ref. Para. 6.C. and 6.D.) :
- replacement of fluid by repeated operations when the rate of contamination is higher than allowed value (Ref. 12-32-29, P. BLock 1). This procedure permits to replace approximately 70 % of the Green hydraulic fluid.

2. Flushing of Hydraulic Lines on the Aircraft in the Event of Damage to an Engine Pump

NOTE : The following procedure assumes that the hydraulic system HP filter elements are in satisfactory condition.

A. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 2.60 m (8 ft. 6 in.)
	B.	Filter Elements
R	C. 98A29003000000	Hydraulic Connectors Tool
	Referenced Procedures	
	- 12-12-29, P. Block 1	Hydraulics
	- 12-32-29, P. Block 1	Hydraulic Fluid
	- 24-41-00, P. Block 301	AC External Power Control
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 29-11-36, P. Block 301	Engine Pump Case Drain - Filter Module Assembly
	- 29-11-42, P. Block 301	Pump Delivery - Filter
	- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
	- 71-13-00, P. Block 301	Cowl Doors

B. Green Hydraulic System

(1)Job Set-up

(a)Open left main landing gear door (Ref. 32-12-11, P. Block 301).

(b)Open fan cowl doors (Ref. 71-13-00, P. Block 301).

(c)In hydraulics compartment :

1 Remove filters 291048 and 291049 from servo control manifold 291010, place fluid recovery container under filter head.

2 Disconnect case drain line from return manifold 291004, install a fluid recovery container.

(d)As applicable, on left or right engine :

1 Disconnect delivery and case drain hoses from pump 291030 (291031) if not already done. Plug open ports of pumps.

2 Connect together hoses previously disconnected using a shop
R equipment union (98A29003000102).

3 Disconnect lines from IN and OUT ports of case drain filter corresponding to system concerned.

4 Connect hydraulic ground power cart to line disconnected from IN
R port using a shop equipment union (98A29003000104).

(e)In zone 147, open door 147AL giving access to Green system ground
R connectors and connect shop equipment line (98A29003000100) to delivery ground connector 291008 to neutralize check valve. Other end of line shall be placed in a fluid recovery container.

(2)Flushing procedure

(a)Operate hydraulic ground power cart for about 20 seconds at maximum flow rate, at approx. 20 bars (290 psi).

NOTE : Hydraulic fluid will flow from open port of filter 291048 and from delivery ground connector 291008 for left engine and only

from open port of filter 291049 for right engine.
(b)Shut down hydraulic ground power cart.
(c)On case drain filter, disconnect hydraulic ground power cart equipped with (98A29003000104) from IN line and connect to OUT line.
(d)Operate ground power cart for about 20 seconds at maximum flow rate, at approx. 20 bars (290 psi).
NOTE : Hydraulic fluid will flow from disconnected case drain line at return manifold 291004.
(e)Shut down hydraulic ground power cart.
(3)Restoration of system to operating condition
(a)Disconnect hydraulic ground power cart and replace case drain filter element after having cleaned bowl (Ref. 29-11-36, P. Block 301). Reconnect lines to case drain filter.
(b)Install filters 291048, 291049 on manifold 291010 after having cleaned bowl and replaced filter element (Ref. 29-11-42, P. Block 301).
(c)Connect case drain line to return manifold 291004.
(d)Disconnect shop equipment line from ground connector 291008.
(e)On hydraulic pump concerned :
1 Remove shop equipment union from delivery and case drain hoses.
2 Remove blanking plugs from hydraulic pump ports.
3 Connect hoses to pump, tighten to the following torque valves :
- case drain hose : 270 to 300 lbf. in. (3.05 to 3.39 m.daN).
- delivery hose : 900 to 1000 lbf. in. (10.17 to 11.3 m.daN).
(f)Remove fluid recovery containers at manifolds 291010 and 291004 and at hydraulic ground connector.
(g)Close fan cowl doors (Ref. 71-13-00, P. Block 301).
(h)Close access door 147AL to Green system ground connectors.
(j)Close main landing gear door (Ref. 32-12-11, P. Block 301).

C. Blue Hydraulic System
(1)Job set-up
R (a)Position access platform at zone 571 and open access door 571BB.
(b)Open fan cowl doors (Ref. 71-13-00, P. Block 301).
(c)In zone 571
1 Remove filter 292048 from servo control manifold 292010 and place fluid recovery container under filter head.
2 Disconnect case drain line from return manifold 292004 and place a fluid recovery container.
(d)On left engine
1 At Blue system hydraulic pump 292030, disconnect delivery and case drain hoses if not already done. Plug open ports of pump.
2 Connect together hoses previously disconnected using a shop equipment union (98A29003000102).
3 Disconnect lines from IN and OUT ports of Blue system pump case drain filter.
4 Connect hydraulic ground power cart to line disconnected from IN port using a shop equipment union (98A29003000104).
(e)In zone 571, open door 571DB giving access to Blue system ground connectors and connect shop equipment line (98A29003000100) to delivery ground connector 292008 to neutralize check valve. Other end of line shall be placed in a fluid recovery container.

(2)Flushing procedure
(a)Operate hydraulic ground power cart for about 20 seconds at maximum flow rate, at approx. 20 bars (290 psi).
NOTE : Hydraulic fluid will flow from port of filter 292048 and from delivery ground connector 292008.
(b)Shut down hydraulic ground power cart.
(c)On case drain filter, disconnect hydraulic ground power cart equipped with (98A29003000104) from IN line and connect to OUT line.
(d)Operate ground power cart for about 20 seconds at maximum flow rate, at approx. 20 bars (290 psi).
NOTE : Hydraulic fluid will flow from disconnected case drain line at return manifold 292004.
(e)Shut down hydraulic ground power cart.
(3)Restoration of system to operating condition
(a)Disconnect hydraulic ground power cart and replace case drain filter element after having cleaned bowl and head (Ref. 29-11-36, P. Block 301). Reconnect lines to case drain filter.
(b)Install filter 292048 on manifold 292010 after having cleaned bowl and head and replaced filter element (Ref. 29-11-42, P. Block 301).
(c)Connect case drain line to return manifold 292004.
(d)Disconnect shop equipment line from ground connector 292008.
(e)On Blue system pump (292030) :
1 Remove shop equipment union from delivery and case drain hoses.
2 Remove blanking plugs from hydraulic pump ports.
3 Connect hoses to pump, tighten to the following torque values :
- case drain hose : 270 to 300 lbf. in. (3.05 to 3.39 m.daN).
- delivery hose : 900 to 1000 lbf. in. (10.17 to 11.3 m.daN).
(f)Remove fluid recovery containers at manifolds 292010 and 292004 and at at hydraulic ground connector.
(g)Close fan cowl doors (Ref. 71-13-00, P. Block 301).
(h)Close access door 571DB to hydraulic ground connector.
R (j)Close access door 571BB.
(k)Remove access platform at zone 571.

D. Yellow Hydraulic System
(1)Job set-up
(a)Open main landing gear door (Ref. 32-12-11, P. Block 301).
(b)Open fan cowl doors (Ref. 71-13-00, P. Block 301).
(c)In hydraulics compartment :
1 Remove filter 293049 from servo control manifold 293010, place fluid recovery container under filter head.
2 Disconnect case drain line from return manifold 293004, install a fluid recovery container.
(d)On right engine
1 Disconnect delivery and case drain hoses from Yellow system pump (293030) if not already done. Plug open ports of pump.
2 Connect together hoses previously disconnected using shop equipment union (98A29003000102).
3 Disconnect lines from IN and OUT ports of Yellow system pump case drain filter.
4 Connect hydraulic ground power cart to line disconnected from IN

R port using a shop equipment union (98A29003000104).
(e)In zone 671, open access door 671DB giving access to Yellow system
R ground connectors and connect shop equipment line (98A29003000100) to delivery ground connector 293008 to neutralize check valve. Other end of line shall be be placed in a fluid recovery container.
(f)In zone 671, disconnect hose item 293553 from RAT ground check out module 293027. Install fluid recovery container.
(2)Flushing procedure
(a)Operate hydraulic ground power cart for about 20 seconds at maximum flow rate, at approx. 20 bars (290 psi).
NOTE : Hydraulic fluid will flow from port of filter 293049, from delivery ground connector 293008 and from disconnected hose 293553.
(b)Shut down hydraulic ground power cart.
(c)On case drain filter, disconnect hydraulic ground power cart equipped
R with (98A29003000104) from IN line and connect to OUT line.
(d)Operate ground power cart for about 20 seconds at maximum flow rate, at approx. 20 bars (290 psi).
NOTE : Hydraulic fluid will flow from disconnected case drain line at return manifold 293004.
(e)Shut down hydraulic ground power cart.
(3)Restoration of system to operating condition.
(a)Disconnect hydraulic ground power cart and replace case drain filter element after having cleaned bowl and head (Ref. 29-11-36, P. Block 301). Reconnect lines to case drain filter.
(b)Install filter 293049 on manifold 293010 after having cleaned bowl and head and replaced filter element (Ref. 29-11-42, P. Block 301).
(c)Connect case drain line to return manifold 293004.
R (d)Disconnect shop equipment line (98A29003000100) from delivery ground connector 293008.
(e)Connect hose item 293553 to RAT ground check out module 293027.
(f)On Yellow system hydraulic pump (293030)
R 1 Remove shop equipment unions (98A29003000104 and 98A29003000102) from delivery and case drain hoses.
2 Remove blanking plugs from hydraulic pump ports.
3 Connect hoses to pump, tighten to the following torque values :
- case drain hose : 270 to 300 lbf. in. (3.05 to 3.39 m.daN).
- delivery hose : 900 to 1000 lbf. in. (10.17 to 11.3 m.daN).
(g)Remove fluid recovery containers at manifolds 293010 and 293004, at RAT ground check out module 293027 and at ground connector 293008.
(h)Close fan cowl doors (Ref. 71-13-00, P. Block 301).
(j)Close access door 671DB to Yellow system ground connector.
(k)Close main landing gear door (Ref. 32-12-11, P. Block 301).

3. Flushing of Hydraulic Lines of Pump without Using a Hydraulic Ground Power Cart
WARNING : OBSERVE THE SAFETY PRECAUTIONS WHEN WORKING ON THE HYDRAULIC SYSTEMS (Ref. 29-00-00, P. Block 301).

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Filter Elements
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 12-32-29, P. Block 1	Hydraulic Fluid
- 24-41-00, P. Block 301	AC External Power Control
- 29-00-00, P. Block 301	Hydraulic - General
- 29-11-32, P. Block 401	Pump - Engine
- 29-14-00, P. Block 301	Hyraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

B. Green Hydraulic System

NOTE : After engine pump replacement and bleeding (Ref. 29-11-32, P. Block 401), make certain that the case drain, HP and LP hydraulic filters associated to the replaced pump have been checked (Ref. 29-00-00, P. Block 301).
Make certain that after filter element(s) replacement, clogging indicator(s) has (have) been reset.

NOTE : This procedure for the Green hydraulic fluid is for engine 1 and is the same for engine 2.

(1)Job Set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics rack ventilation is correct.

(b)Pressurize hydraulic reservoir (Ref. 29-14-00, P. Block 301).

(c)Check fluid level in hydraulic reservoir, top-up if required (Ref. 12-12-29, P. Block 1).

(d)On HYD PWR panel 427VU, make certain that :
- concerned ENG PUMPS pushbutton switch is pressed (in) (OFF legend off)
- Green/Blue and Green/Yellow PTU pushbutton switches are released (out) (ON legend off)
- AIR/OVHT legends are off.

(2)Flushing Procedure

(a)Start engine 1 (Ref. 71-00-00, P. Block 501).

NOTE : If both Green hydraulic engine pumps have been removed and Green engine 1 and engine 2 lines have to be flushed, do not perform the described procedure with both engines running at the same time (Otherwise only one Green pump will deliver the required flow the other one will be in standby). Consequently, perform the procedure one engine after the other.

(b)During 10 mn approximately :
- operate the flight control surfaces associated to the system
- operate the lines to be flushed in order to cause a hydraulic flow to the system filters.

(c)Stop engine 1 (Ref. 71-00-00, P. Block 501).

(d)Check clogging indicators of :
(Ref. 29-00-00, P. Block 301)

- case drain filter
- HP filter 1048 (1049)
- LP filter 1002

(e)If necessary, replace filter element of involved filter and reset indicator.
Whatever clogging indicator position (in/out), remove and clean filter bowls.

(f)Perform again steps (a) to (e) until clogging indicators stay in, then stop engine 1 and de-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(g)Replace case drain, HP and LP filter elements to make sure that aircraft is not released for flight with a filter element partially clogged.

(h)Do a fluid sampling for particle contamination (Ref. 12-32-29, P. Block 1).

(j)Check fluid level in hydraulic reservoir, top-up if required (Ref. 12-12-29, P. Block 1).

(k)After the next flight following the maintenance action, perform a clogging indicator check of above filters and replace filter element(s) as necessary.
If a clogging indicator is found protruding, repeat check after further flight.

(3)Close-up

(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

C. Blue Hydraulic System

NOTE : After engine pump replacement and bleeding (Ref. 29-11-32, P. Block 401), make certain that the case drain, HP and LP hydraulic filters associated to the replaced pump have been checked (Ref. 29-00-00, P. Block 301).
Make certain that after filter element(s) replacement, clogging indicator(s) has (have) been reset.

(1)Job Set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics rack ventilation is correct.

(b)Pressurize hydraulic reservoir (Ref. 29-14-00, P. Block 301).

(c)Check fluid level in hydraulic reservoir, top-up if required (Ref. 12-12-29, P. Block 1).

(d)On HYD PWR panel 427VU, make certain that :

- concerned ENG PUMPS pushbutton switch is pressed (in). (OFF legend off).
- Green/Blue PTU pushbutton switch is released (out) (ON legend off)
- AIR/OVHT legends are off.

(2)Flushing Procedure

(a)Start engine 1 (Ref. 71-00-00, P. Block 501).

(b)During 10 mn approximately :

- operate the flight control surfaces associated to the system
- operate the lines to be flushed in order to cause a hydraulic flow to the system filters.

(c)Stop engine 1 (Ref. 71-00-00, P. Block 501).

(d)Check clogging indicators of :
(Ref. 29-00-00, P. Block 301)
- case drain filter
- HP filter 2048
- LP filter 2002

(e)If necessary, replace filter element of involved filter and reset indicator.
Whatever clogging indicator position (in/out), remove and clean filter bowls.

(f)Perform again steps (a) to (e) until clogging indicators stay in, then stop engine 1 and de-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(g)Replace case drain, HP and LP filter elements to make sure that aircraft is not released for flight with a filter element partially clogged.

(h)Do a fluid sampling for particle contamination (Ref. 12-32-29, P. Block 1).

(j)Check fluid level in hydraulic reservoir, top-up if required (Ref. 12-12-29, P. Block 1).

(k)After the next flight following the maintenance action, perform a clogging indicator check of above filters and replace filter element(s) as necessary.
If a clogging indicator is found protruding, repeat check after further flight.

(3)Close-up

(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

D. Yellow Hydraulic System

NOTE : After engine pump replacement and bleeding (Ref. 29-11-32, P. Block 401), make certain that the case drain, HP and LP hydraulic filters associated to replaced pump have been checked (Ref. 29-00-00, P. Block 301).
Make certain that after filter element(s) replacement, clogging indicator(s) has (have) been reset.

(1)Job Set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics rack ventilation is correct.

(b)Pressurize hydraulic reservoir (Ref. 29-14-00, P. Block 301).

(c)Check fluid level in hydraulic reservoir, top-up if required (Ref. 12-12-29, P. Block 1).

(d)On HYD PWR panel 427VU, make certain that :
- concerned ENG PUMPS pushbutton switch is pressed (in). OFF legend off
- Green/Yellow PTU pushbutton switch is released (out) (ON legend off)
- AIR/OVHT legends are off.

(2)Flushing Procedure

(a)Start engine 2 (Ref. 71-00-00, P. Block 501).

(b)During 10 mn approximately :
- operate the flight control surfaces associated to the system
- operate the lines to be flushed in order to cause a hydraulic flow to the system filters.

(c)Stop engine 2 (Ref. 71-00-00, P. Block 501).
(d)Check clogging indicators of :
(Ref. 29-00-00, P. Block 301)
- case drain filter
- HP filter 3049
- LP filter 3002
(e)If necessary, replace filter element of involved filter and reset indicator.
Whatever clogging indicator position (in/out), remove and clean filter bowls.
(f)Perform again steps (a) to (e) until clogging indicators stay in, then stop engine 2 and de-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(g)Replace case drain, HP and LP filter elements to make sure that aircraft is not released for flight with a filter element partially clogged.
(h)Do a fluid sampling for particle contamination (Ref. 12-32-29, P. Block 1).
(j)Check fluid level in hydraulic reservoir, top-up if required (Ref. 12-12-29, P. Block 1).
(k)After the next flight following the maintenance action, perform a clogging indicator check of above filters and replace filter element(s) as necessary.
If a clogging indicator is found protruding, repeat check after further flight.

(3)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

4. Cleaning of Hydraulic System Fluid (Using PALL Purifier)

WARNING : OBEY THE HYDRAULIC SAFETY PROCEDURES.
WORK ON THE HYDRAULIC SYSTEMS CAN BE DANGEROUS.

WARNING : DO NOT TOUCH THE HYDRAULIC SYSTEM COMPONENTS UNTIL THEY ARE COOL.
THE ENGINE COMPONENTS STAY HOT FOR SOME TIME AND CAN CAUSE INJURY.

WARNING : DO NOT GET HYDRAULIC FLUID ON YOUR SKIN, IN YOUR EYES OR IN YOUR MOUTH. HYDRAULIC FLUID IS POISONOUS AND CAN GO THROUGH YOUR SKIN AND INTO YOUR BODY. FLUSH HYDRAULIC FLUID FROM YOUR EYES, MOUTH OR SKIN WITH WATER. GET MEDICAL AID IF YOU GET HYDRAULIC FLUID IN YOUR EYES OR MOUTH.

CAUTION : DO NOT LET HYDRAULIC FLUID FALL ON THE ENGINE. UNWANTED HYDRAULIC FLUID MUST BE REMOVED IMMEDIATELY WITH A CLEAN LINT FREE CLOTH. THE FLUID CAN CAUSE DAMAGE TO THE SURFACE PROTECTION AND TO SOME PARTS.

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform (2.60 m (8 ft 6 in.)
(2)HSPA181-380J	Hydraulic Purifier
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 12-32-29, P. Block 1	Hydraulic Fluid
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurizarion/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

B. Green Hydraulic System

(1)Job Set-up

(a)Position access platform.

(b)Open access door 147AL.

(c)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(d)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(e)On left ECAM display unit, make certain that :

- GREEN RSVR LO AIR PRESS warning message is not shown.
  If this message is shown, pressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).

(f)On right ECAM display unit, on HYD page, make certain that :

- level index of Green reservoir shows that fluid level is correct.
  If level is not correct, add fluid to reservoir (Ref. 12-12-29, P. Block 1).

(g)Connect suction and delivery lines of PALL hydraulic purifier (HSPA181-380J) to hydraulic ground service panel :

- 291006 ground connector-suction,
- 291008 ground connector-delivery.

(h)Make certain that flap/slat control lever is in 0 position and that speed brake control lever is in RET position.
(j)On SERVO CTL section of panel 428VU, make certain that G pushbutton switch is pressed (in).

(2)Cleaning Procedure

WARNING : MAKE SURE THAT THE GROUND SAFETY-LOCKS ARE CORRECTLY INSTALLED ON THE LANDING GEAR.
THIS PREVENTS UNWANTED MOVEMENT OF THE LANDING GEAR.

WARNING : MAKE SURE THAT THE TRAVEL RANGES OF THE FLIGHT CONTROLS ARE CLEAR.
MOVEMENT OF FLIGHT CONTROLS CAN CAUSE INJURY TO PERSONS AND/OR DAMAGE.

NOTE : Obey manufacturer instructions for hydraulic purifier.

(a)Set main pump of hydraulic purifier to ON.
R (b)Operate purifier for 30 minutes.
R (c)Operation of flight controls :
1 Move control wheel slowly in full nose-up, full nose down, full left roll and full right roll directions :
- ailerons, elevators, and spoilers 5 move in relation to control wheel orders.
2 Place control wheel in neutral position :
- surfaces return to neutral position.
3 Push right then left pedal to the mechanical stop :
- rudder moves in relation to pedal orders.
4 Place pedals in neutral position :
- rudder returns to neutral position.
5 Place speedbrake control lever in ground spoiler preselection position :
- spoilers 5 extend.
6 Place speedbrake control lever in RET position :
- spoilers 5 retract.
7 On panel 9VU, place slat/flap control lever in FULL position :
- slats and flaps extend.
8 On panel 9VU, place slat/flap control lever in position 1 :
- slats and flaps retract.
9 On center pedestal, move pitch trim control wheel to full nose-up then to full nose-down position :
- THS moves to up then to down position.
10 Move pitch trim control wheel to neutral position :
- THS moves to neutral position.
(e)Check water contents indicator at purifier.
(f)If water contents is high, continue to operate purifier.
(g)Stop cleaning procedure when water contents indicator shows a low water contents.
(h)Set main pump of hydraulic purifier to OFF.
(j)Disconnect suction and delivery lines of hydraulic purifier from aircraft connectors.

(3)Close-up

(a)On left ECAM display unit, make certain that :

- GREEN RSVR LO AIR PRESS warning message is not shown.
  If this message is shown pressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).

(b)On right ECAM display unit, make certain that :
- level index of Green reservoir shows that fluid level is correct.
  If level is not correct, add fluid to reservoir (Ref. 12-12-29, P. Block 1).

(c)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(d)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(e)Close access door 147AL.

(f)Remove access platform.

C. Blue Hydraulic System

(1)Job set-up

(a)Position access platform.

(b)Open access door 571DB.

(c)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(d)Depressurize Blue hydraulic system (Ref. 29-10-00, P. Block 301).

(e)On left ECAM display unit, make certain that :
- BLUE RSVR LO AIR PRESS warning message is not shown.
  If this message is shown, pressurize Blue hydraulic reservoir (Ref. 29-14-00, P. Block 301).

(f)On right ECAM display unit, on HYD page, make certain that :
- level index of Blue reservoir shows that fluid level is correct.
  If level is not correct, add fluid to reservoir (Ref. 12-12-29, P. Block 1).

(g)Connect suction and delivery lines of PALL hydraulic purifier (HSPA181-380J) to hydraulic ground service panel :
- 292006 ground connector-suction,
- 292008 ground connector-delivery.

(h)Make certain that flap/slat control lever is in 0 position and that speedbrake control lever is in RET position.

(j)On SERVO CTL section of panel 428VU, make certain that B pushbutton switch is pressed (in).

(2)Cleaning procedure

WARNING : MAKE SURE THAT THE GROUND SAFETY-LOCKS ARE CORRECTLY INSTALLED ON THE LANDING GEAR.
THIS PREVENTS UNWANTED MOVEMENT OF THE LANDING GEAR.

WARNING : MAKE SURE THAT THE TRAVEL RANGES OF THE FLIGHT CONTROLS ARE CLEAR.
MOVEMENT OF FLIGHT CONTROLS CAN CAUSE INJURY TO PERSONS AND/OR DAMAGE.

NOTE : Obey manufacturer instructions for hydraulic purifier.

(a)Set main pump of hydraulic purifier to ON.

R (b)Operate purifier for 30 minutes.

R (c)Operation of flight controls :

1 Move control wheel slowly in full nose-up, full nose down, full left roll and full right roll directions :
- ailerons, elevators, and spoilers 3 and 7 move in relation to

control wheel orders.
2 Place control wheel in neutral position :
- surfaces return to neutral position.
3 Push right, then left pedal to the mechanical stop :
- rudder moves in relation to pedal orders.
4 Place pedals in neutral position :
- rudder returns to neutral position.
5 Place speedbrake control lever in ground spoiler preselection position :
- spoilers 2, 3 and 7 extend.
6 Place speedbrake control lever in RET position :
- spoilers 2, 3 and 7 retract.
7 On panel 9VU, place slat/flap control lever in FULL position :
- slats and flaps extend.
8 On panel 9VU, place slat/flap control lever in position 1 :
- slats and flaps retract.
9 On center pedestal, move pitch trim control wheel to full nose-up then to full nose-down position :
- THS moves to up then to down position.
10 Move pitch trim control wheel to neutral position :
- THS moves to neutral position.

(e)Check water contents indicator at purifier.
(f)If water contents is high, continue to operate purifier.
(g)Stop cleaning procedure when water contents indicator shows a low water contents.
(h)Set main pump of hydraulic purifier to OFF.
(j)Disconnect suction and delivery lines of hydraulic purifier from aircraft connectors.

(3)Close-up
(a)On left ECAM display unit, make certain that :
- BLUE RSVR LO AIR PRESS warning message is not shown.
If this message is shown pressurize Blue hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(b)On right ECAM display unit, on HYD page, make certain that :
- level index of Blue reservoir shows that fluid level is correct.
If level is not correct, add fluid to reservoir (Ref. 12-12-29, P. Block 1).
(c)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(d)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(e)Close access door 571DB.
(f)Remove access platform.

D. Yellow Hydraulic System
(1)Job set-up
(a)Position access platform.
(b)Open access door 671DB.
(c)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)Depressurize Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(e)On left ECAM display unit, make certain that :

- YELLOW RSVR LO AIR PRESS warning message is not shown.
  If this message is shown, pressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).

(f)On right ECAM display unit, on HYD page, make certain that :
- level index of Yellow reservoir shows that fluid level is correct.
  If level is not correct, add fluid to reservoir (Ref. 12-12-29, P. Block 1).

(g)Connect suction and delivery lines of PALL hydraulic purifier (HSPA181-380J) to hydraulic ground service panel :
- 293006 ground connector-suction,
- 293008 ground connector-delivery.

(h)Make certain that flap/slat control lever is in 0 position and that speedbrake control lever is in RET position.

(j)On SERVO CTL section of panel 428VU, make certain that Y pushbutton switch is pressed (in).

(2)Cleaning procedure

WARNING : MAKE SURE THAT THE GROUND SAFETY-LOCKS ARE CORRECTLY INSTALLED ON THE LANDING GEAR.
THIS PREVENTS UNWANTED MOVEMENT OF THE LANDING GEAR.

WARNING : MAKE SURE THAT THE TRAVEL RANGES OF THE FLIGHT CONTROLS ARE CLEAR.
MOVEMENT OF FLIGHT CONTROLS CAN CAUSE INJURY TO PERSONS AND/OR DAMAGE.

NOTE : Obey manufacturer instructions for hydraulic purifier.

(a)Set main pump of hydraulic purifier to ON.

R (b)Operate purifier for 30 minutes.

R (c)Operation of flight controls :

1 Move control wheel slowly in full nose-up, full nose down, full left roll and full right roll directions :
- ailerons, elevators, and spoilers 4 and 6 move in relation to control wheel orders.

2 Place control wheel in neutral position :
- surfaces return to neutral position.

3 Push right then left pedal to the mechanical stop :
- rudder moves in relation to pedal orders.

4 Place pedals in neutral position :
- rudder returns to neutral position.

5 Place speedbrake control lever in ground spoiler preselection position :
- spoilers 1, 4 and 6 extend.

6 Place speedbrake control lever in RET position :
- spoilers 1, 4 and 6 retract.

7 On panel 9VU, place slat/flap control lever in FULL position :
- slats and flaps extend.

8 On panel 9VU, place slat/flap control lever in position 1 :
- slats and flaps retract.

9 On center pedestal, move pitch trim control wheel to full nose-up then to full nose-down position :
- THS moves to up then to down position.

10 Move pitch trim control wheel to neutral position :
- THS moves to neutral position.

(e)Check water contents indicator at purifier.
(f)If water contents is high, continue to operate purifier.
(g)Stop cleaning procedure when water contents indicator shows a low water contents.
(h)Set main pump of hydraulic purifier to OFF.
(j)Disconnect suction and delivery lines of hydraulic purifier from aircraft connectors.

(3)Close-up
(a)On left ECAM display unit, make certain that :
- YELLOW RSVR LO AIR PRESS warning message is not shown.
If this message is shown pressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).

(b)On right ECAM display unit, on HYD page, make certain that :
- level index of Yellow reservoir shows that fluid level is correct.
If level is not correct, add fluid to reservoir (Ref. 12-12-29, P. Block 1).

(c)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(d)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(e)Close access door 671DB.
(f)Remove access platform.

5. Cleaning Hydraulic Fluid in Aircraft Systems

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.60 m (8 ft. 6 in.)
(2)	Filter Elements
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 12-32-29, P. Block 1	Hydraulic Fluid
- 24-41-00, P. Block 301	AC External Power Control
- 29-00-00, P. Block 301	Hydraulic - General
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Job Set-up
(1) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics rack ventilation is correct.
(2) Connect hydraulic ground power cart to system to be cleaned (hydraulic ground power connectors or engine pump lines). Pressurize system (Ref. 29-10-00, P. Block 301).
(3) Open left main landing gear door (Ref. 32-12-11, P. Block 301).

C. Procedure
(1) Maintain fluid flow in system by actuating all flight controls and the brakes (for Green and Yellow systems).
(2) Sample hydraulic fluid and check for rate of contamination (Ref. 12-32-29, P. Block 1).
(3) Continue operating flight controls and sampling hydraulic fluid until rate of contamination is close to that of initial state.
(4) Perform a clogging indicator check of hydraulic HP delivery filters and reservoir return filters. (Ref. 29-00-00, P. Block 301) check of hydraulic filters.
NOTE : If fluid contamination is due to engine pump deterioration check also relevant case drain filter (Ref. 29-00-00, P. Block 301) check of hydraulic filters.

D. Close-Up
(1) Shut down and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301). De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2) Check fluid level in hydraulic reservoirs. Replenish as required (Ref. 12-12-29, P. Block 1).
(3) Remove all access equipment.
(4) Close left main landing gear door (Ref. 32-12-11, P. Block 301).

6. Replacement of Hydraulic Fluid

A. Replacement of Hydraulic Fluid in Green System with Aircraft Jacked and Using a Ground Power Cart

(1)Equipment and materials

ITEM	DESIGNATION
(a)	Warning Notices
(b)	Access Platform, 2.60 m (8 ft. 6 in.)
(c)	Container
(d)97A29102093000	Equipment - Hydraulic System Draining
(e)99A29101005000	Manifold - Hydraulic Low Pressure
Referenced Procedures	
- 07-11-00, P. Block 1	Jacking for Aircraft Maintenance Operations
- 12-12-29, P. Block 1	Hydraulics
- 07-12-00, P. Block 1	Jacking for Wheel Change
- 12-32-29, P. Block 1	Hydraulic Fluid
- 22-13-23, P. Block 401	Actuator - Auto Pilot Pitch
- 24-24-00, P. Block 501	Emergency AC Generation
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 27-33-00, P. Block 501	Artificial Feel (Elevator)
- 27-41-00, P. Block 501	Mechanical Control (THS)
- 27-50-00, P. Block 301	Flaps
- 27-61-00, P. Block 501	Electrical and Mechanical Control (Spoilers and Speedbrakes)
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-00-00, P. Block 301	General
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-11-32, P. Block 401	Pump - Engine
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 32-31-00, P. Block 501	Normal Extension and Retraction
- 32-42-00, P. Block 501	Normal Braking
- 32-51-00, P. Block 501	Steering
- 71-13-00, P. Block 301	Cowl Doors

(2)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics rack ventilation is correct.

(b)Open RH main landing gear door (Ref. 32-12-11, P. Block 301).

(c)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

- in hydraulics compartment, place system isolation valves (F, G and H) associated to concerned hydraulic system in open position.

(d)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(e)In flight compartment, display warning notices prohibiting operation of electric pumps and power transfer units.
On ground service panel, display warning notice prohibiting pressurization of Green hydraulic system with ground power cart.
(f)Open engine fan cowl doors (Ref. 71-13-00, P. Block 301).
(g)On HYD PWR section of panel 471VU, check that Green hydraulic fire valves are open.
(h)On SERVO CTL section of panel 428VU, make certain that G pushbutton switch is pressed (in).
(j)Take all appropriate safety and technical precautions (Ref. 29-00-00, P. Block 301).
(k)Flush hydraulic ground power cart. The cart shall not be equipped with auxiliary tank, or, if it is, the tank shall be isolated.

(3)Replacement of fluid

NOTE : Hydraulic system total fluid capacity :
170 liters (44.880 US Gal) approx. including reservoir normal capacity (i.e. 17 liters (4.488 US Gal)).

NOTE : Replacement operation includes following actions to be performed and repeated as indicated :
- partial draining of Green system (reservoir and pump suction lines) at pumps inlet port with refilling and bleeding (to be done once at the beginning),
- installation of hydraulic low pressure manifold draining equipment and ground power cart at engine 2 pylon interface (to be done once at the beginning),
- perform simplified cycles to mix new and old fluid including partial draining of Green system (reservoir and pump suction lines) at engine 2 pylon interface with draining equipment with refilling and bleeding to be done after each simplified cycle (to be done seven times).
  NOTE : For accomplishment of the simplified cycles, aircraft must be jacked.
- with aircraft on wheels, perform dry motoring of engine 1 then 2 with simplified cycles (to be done three times),
- drain hydraulic fluid from each normal brake and line downstream of brake servo-valve (to be done once).

(a)Partial draining of Green hydraulic system, refilling and bleeding of Green system to be done once at the beginning.
1 Completely drain hydraulic fluid from reservoir and pump suction lines as follows :
- pressurize Green hydraulic reservoir to 0.5 bars (7.3 psi) (Ref. 29-14-00, P. Block 301) and keep it to that value up to complete reservoir and pump suction line draining,
- put a recovery container (about 40 liters (10.560 US Gal) capacity) under hydraulic pump suction port of engine 1,
- disconnect suction hose at self-sealing connection on engine pump,
- remove union from pump suction port and install a plug on pump suction port,
- slowly screw removed union onto self-sealing connection to open it and completely drain fluid from reservoir and suction lines into

recovery container,
- perform same procedure for engine 2 pump.

2 Refill and bleed hydraulic reservoir and pump suction line :
- remove union from self-sealing connection,
- refill reservoir and suction line (Ref. 12-12-29, P. Block 1). Slowly screw removed union on self-sealing connection slightly opened to bleed suction lines.
As soon as fluid flowing out from quick-release coupling/union is free of air/bubbles, unscrew union from coupling to close coupling.
- re-install union with a new packing to pump (Ref. 29-11-32, P. Block 401) and add approx. 8 to 10 liters (2.112 US Gal to 2.640 US Gal) to the reservoir.
NOTE : Use a second wrench to hold union during torque procedure to prevent torque transmission to pump during suction hose installation.
- bleed both hydraulic pumps (Ref. 29-11-32, P. Block 401) and add approx. 8 liters (2.112 US Gal) to the reservoir.

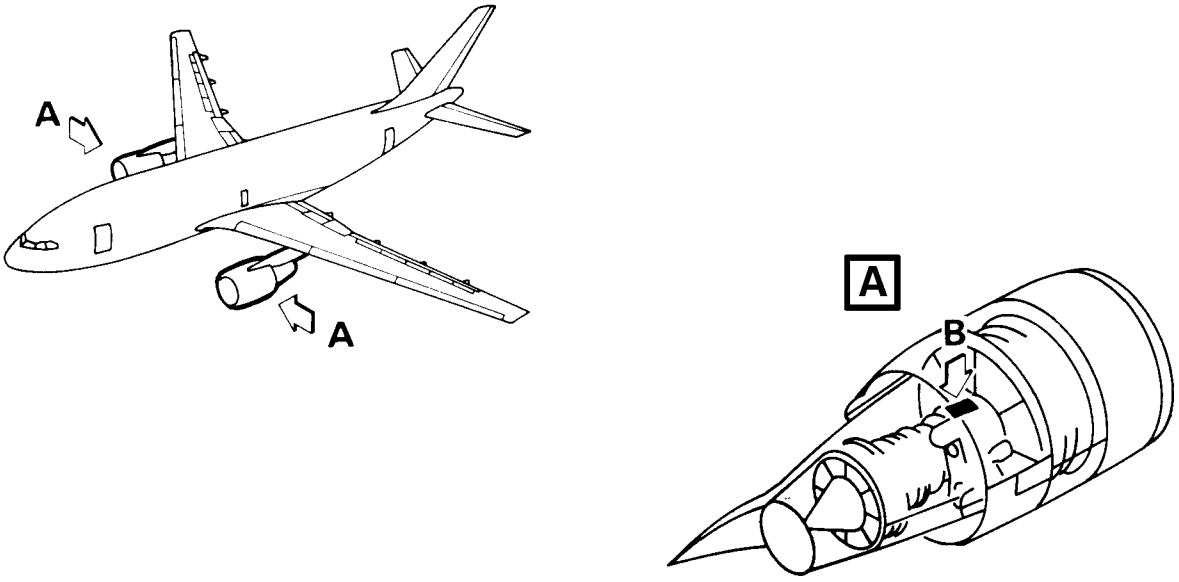
(b)Installation of hydraulic low pressure manifold, draining equipment and ground power cart at engine 2 pylon interface (to be done once at the beginning).
(Ref. Fig. 001)
NOTE : Hydraulic low pressure manifold and draining equipment are to facilitate draining procedure after each simplified cycle.

1 Position access platform.
2 In engine 2 pylon, disconnect Green engine pump suction line at interface plate.
3 Connect hydraulic low pressure manifold (99A29101005000) to interface plate.
4 Make sure that shut off valve on hydraulic draining equipment (97A29102093000) is closed.
5 Connect draining equipment to low pressure manifold.
6 Connect hydraulic ground power cart to low pressure manifold.
7 Slightly open shut off valve to drain system then close it.

(c)Simplified cycles to mix new and old fluid.

1 Pressurize Green hydraulic system using ground power cart to perform following procedure once :
- jack-up nose gear (wheels off ground) (Ref. 07-12-00, P. Block 1),
- steer nose wheel full left and full right three times (Ref. 32-51-00, P. Block 501),
- lower nose gear onto its wheels (Ref. 07-12-00, P. Block 1).
NOTE : The above steering operation is to be done once before accomplishment of the first simplified cycle and aircraft jacking.
- jack-up aircraft (Ref. 07-11-00, P. Block 1).

2 With aircraft on jacks and system pressurized with ground power cart perform following procedure seven times :
- retract and extend landing gear twice (Ref. 32-31-00, P. Block 501),
- fully cycle flaps/slats (twice) (Ref. 27-50-00, P. Block 301) and (Ref. 27-80-00, P. Block 301),
- fully cycle spoilers and speedbrakes (twice) (Ref. 27-61-00, P. Block 501),



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Connection of Draining Equipment
Figure 001

- operate trimmable horizontal stabilizer for a few seconds (Ref. 27-41-00, P. Block 501),
- fully cycle ailerons, rudder and elevators (twice) (Ref. 27-31-00, P. Block 501), (Ref. 27-21-00, P. Block 501) and (Ref. 27-11-00, P. Block 501),
- fully apply brakes (Normal mode) (three times) (Ref. 32-42-00, P. Block 301),
- operate standby generator (Ref. 24-24-00, P. Block 501).
- operate pitch feel (twice) (Ref. 27-33-00, P. Block 501).
- operate yaw autopilot (twice) (Ref. 22-13-23, P. Block 401).
- shut down ground power cart and start Green electric pumps (Ref. 29-21-00, P. Block 301) and Green/Blue and Green/Yellow power transfer units for approx. 3 minutes (Ref. 29-22-00, P. Block 301) and (Ref. 29-23-00, P. Block 301).
- Lower aircraft onto its wheels (Ref. 07-11-00, P. Block 1).

3 Draining, refilling and bleeding with the draining equipment :

- depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301),
- depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301). Pressurize reservoir to 0.5 bars (7.3 psi) and keep it at that value until draining is completed,
- open shut off valve on draining equipment and completely drain reservoir and suction lines into a recovery container,
- close shut off valve at end of draining,
- add approx. 8 liters (2.112 US Gal) to reservoir,
- bleed suction lines by slightly opening reservoir shut off valve on draining equipment until airfree hydraulic fluid flows out from equipment into a recovery container,
- at end of bleeding, close shut off valve and fill reservoir to 8 liters (2.112 US Gal), if necessary,
- pressurize Green hydraulic reservoir to normal value (Ref. 29-14-00, P. Block 301),
- pressurize system with ground power cart for approx. two minutes and then shut down cart,
- top up Green reservoir to approx. 8 liters (2.112 US Gal) if necessary.

(d)With aircraft on wheels, dry motor engines 1 and 2 with simplified cycles (three times for each engine).

1 Disconnect ground power cart, hydraulic low pressure manifold and draining equipment from engine 2 pylon interface.

2 Remove access platform.

3 In flight compartment :

- on **HYD PWR** panel 427VU, release **B (Y) ENG PUMPS** pushbutton switch and make certain that **G ENG PUMPS** pushbutton switch is pressed (in),
- on **SERVO CTL** section of panel 428VU, make certain that **G** pushbutton switch is pressed (in).

NOTE : The procedure is for engine 1, use the indications between brackets for engine 2.

4 Dry motor engine 1(2).

NOTE : During engine dry-motoring, check hydraulic connections (on engine pylon/pump) for leakage.

- fully cycle flaps/slats (twice) (Ref. 27-50-00, P. Block 301)

(Ref. 27-80-00, P. Block 301),
- fully cycle spoilers and speedbrakes (twice) (Ref. 27-61-00, P. Block 501),
- operate trimmable horizontal stabilizer for a few seconds,
- fully cycle ailerons/rudder/elevators (twice) (Ref. 27-31-00, P. Block 501), (Ref. 27-21-00, P. Block 501) and (Ref. 27-11-00, P. Block 501),
- fully apply brakes (Normal mode) (three times) (Ref. 32-42-00, P. Block 301),
- operate standby generator (Ref. 24-24-00, P. Block 501),
- operate pitch feel (twice) (Ref. 27-33-00, P. Block 501),
- operate yaw autopilot (twice) (Ref. 22-13-23, P. Block 401).

5 Stop engine 1(2) dry-motoring.

6 Dry motor engine 2(1) and perform above cycles.

7 Drain reservoir and suction lines (Ref. Para. (a)).

NOTE : At end of third dry-motoring, fill Green reservoir to normal fill level (17 liters) (4.488 US Gal).

(e)Drain hydraulic fluid from each normal brake and line downstream of brake servo valves.
Perform bleeding procedure to collect a minimum of 1 liter (0.264 US Gal) of fluid per brake. To be done once.

(4)Close-up

(a)After approx. one week aircraft operation, take a fluid sample from Green hydraulic system.

(b)In hydraulics compartment place Green system isolation valves (F, G, H) in closed position.

(c)In flight compartment check that :

1 On HYD PWR panel 427VU the four ENG PUMPS pushbutton switches are pressed (in).

2 On SERVO CTL section of panel 428VU the B, G and Y pushbutton switches are pressed (in).

(d)De-energize aircraft electrical network (Ref. 24-41-00, P. Block 301).

(e)Disconnect tools and equipment and restore systems to normal operating condition.

(f)Remove warning notices.

(g)Wipe-up any splilled hydraulic fluid.

(h)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(j)Close access doors to ground connectors.

(k)Close engine fan cowl doors (Ref. 71-13-00, P. Block 301).

(l)Remove access platform.

(m)Check fluid level in Green reservoir. Top-up as required (Ref. 12-12-29, P. Block 1).

B. Replacement of Hydraulic Fluid in Green System (Aircraft on its Wheels and without Ground Power Cart)

CAUTION : DO NOT DEPRESSURIZE THE ENGINE PUMPS DURING THE DRY MOTORING. IF YOU DO, YOU CAN CAUSE DAMAGE TO THE ENGINE PUMPS.

R (Ref. Fig. 002)

(1)Equipment and materials

ITEM	DESIGNATION
(a)	Warning Notices
(b)	Container
(c)	Access Platform, 2.60 m (8 ft. 6 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 12-32-29, P. Block 1	Hydraulic Fluid
- 22-13-23, P. Block 401	Actuator - Auto Pilot Pitch
- 24-24-00, P. Block 501	Emergency AC Generation
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 27-33-00, P. Block 501	Artificial Feel (Elevator)
- 27-41-00, P. Block 501	Mechanical Control (THS)
- 27-50-00, P. Block 301	Flaps
- 27-60-00, P. Block 301	Electrical and Mechanical Control (Spoilers and Speedbrakes)
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-00-00, P. Block 301	General
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization and Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power
- 32-12-11, P. Block 301	Main Gear Door (Ground Door Opening)
- 32-42-00, P. Block 501	Normal Braking
- 71-00-00, P. Block 501	Engine Dry Motoring
- 71-13-00, P. Block 301	Cowl Doors

(2)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 401). Make certain that electronics rack ventilation is correct.

(b)Open RH main landing gear door (Ref. 32-12-11, P. Block 301).

(c)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(d)Depressurize Green system reservoir (Ref. 29-14-00, P. Block 301).

(e)In flight compartment, display warning notice prohibiting operation of elecrtric pumps and power transfer units.

(f)On ground service panel, display warning notice prohibiting pressurization of Green hydraulic system with ground power cart.

(g)Open engine fan cowl doors (Ref. 71-13-00, P. Block 301).

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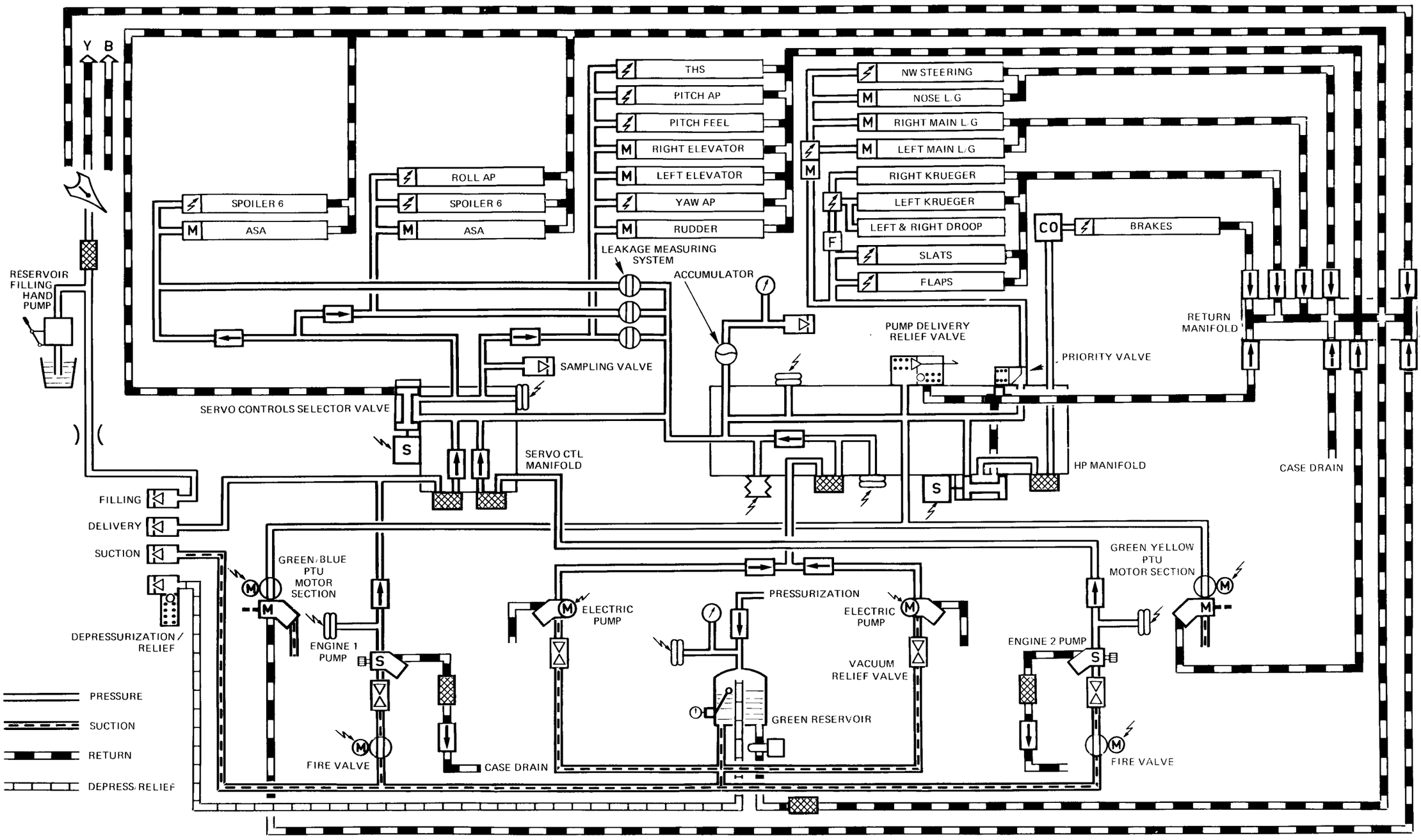


Green Hydraulic System
Figure 002

R

(h)On HYD PWR section of panel 471VU check that Green hydraulic fire valves are open.
(j)On SERVO CTL section of panel 428VU, make certain that G pushbutton switch is pressed (in).
(k)Take all appropriate safety and technical precautions (Ref. 29-00-00, P. Block 301).
(l)Position access platform.

(3)Replacement of fluid (first stage)

NOTE : Replacement of fluid includes following actions :
- partial draining of system
- filling of system
- engine 1 and engine 2 dry-motoring, with flight control movements to mix new and old fluid in system.

NOTE : Green hydraulic system capacity is approximately 170 liters (44.9 US Gal).

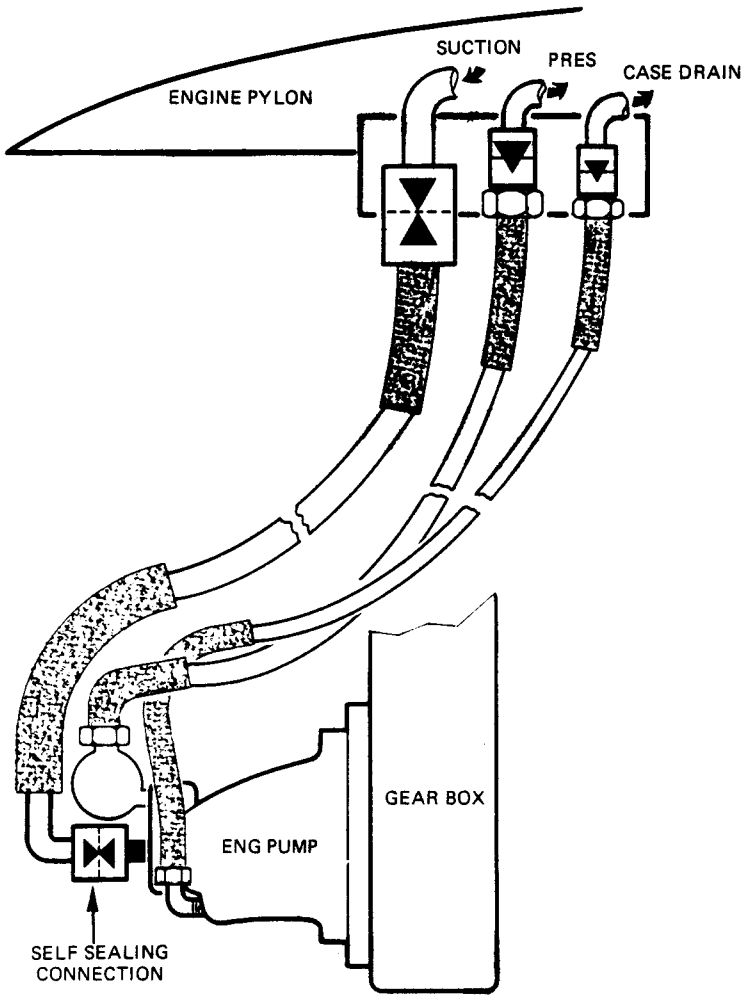
(a)Partial draining of Green hydraulic system
1 In engine 1 and engine 2 disconnect suction hose at self-sealing connection on engine pump.
2 Remove union from pump suction port and install a plug on pump suction port.
3 Install a recovery container under hydraulic suction hose of pump 1 and pump 2.
4 Pressurize Green hydraulic system to 0.5 bars (7.3 psi) (Ref. 29-14-00, P. Block 301).
5 Slowly screw removed union onto self-sealing connection to open it and completely drain fluid from reservoir and suction line into recovery container.
(Ref. Fig. 003)

(b)Filling of hydraulic system
1 Remove union from self-sealing connection.
2 Fill hydraulic reservoir with 15 liters (3.96 US Gal)
3 Slowly screw union on self-sealing connection until fluid flows without air bubbles.
4 Unscrew union from self-sealing connection.
5 Remove plug from engine pump and install union with new packing if necessary (Ref. 29-11-32, P. Block 401).
6 Connect hydraulic suction hose to engine pump.
7 Check hydraulic level, add between 8 liters and 10 liters (2.112 and 2.640 US Gal), if necessary.
8 Bleed engine pump and suction line (Ref. 29-11-32, P. Block 401).
9 Check hydraulic level and add approximately 8 liters (2.112 US Gal) if necessary.

(c)Engine 1 dry-motoring

NOTE : During engine dry-motoring, check hydraulic connection on engine pylon for leakage.

1 In hydraulics compartment, place Green system isolation valves (F, G, H) in open position.
2 In flight compartment :
- on HYD PWR panel 427VU release B ENG PUMPS pushbutton switch and make certain that G ENG 1 PUMPS pushbutton switch is pressed (in).
3 Dry motor engine 1 (Ref. 71-00-00, P. Block 501).



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Hydraulic Self-Sealing Connection
Figure 003

4 Perform following operations :
- Move flap/slat control lever on center pedestal to fourth notch and return to first notch :
  * slats and flaps extend then retract (Ref. 27-50-00, P. Block 301) and (Ref. 27-80-00, P. Block 301),
- Cycle spoilers and speedbrakes once (Ref. 27-60-00, P. Block 301),
- Operate trimmable horizontal stabilizer for a few seconds (Ref. 27-41-00, P. Block 501),
- Fully cycle aileron, rudder, and elevator servo controls (Ref. 27-31-00, P. Block 501), (Ref. 27-21-00, P. Block 501) and (Ref. 27-11-00, P. Block 501),
- Apply brakes (Normal mode) three times (Ref. 32-42-00, P. Block 501).
- Operate standby generator (Ref. 24-24-00, P. Block 501),
- Operate pitch feel (twice) (Ref. 27-33-00, P. Block 501),
- Operate yaw autopilot (twice) (Ref. 22-13-23, P. Block 401).

5 Stop engine 1 dry-motoring

(d)Engine 2 dry-motoring

NOTE : During engine dry-motoring, check hydraulic connection on engine pump for leakage.

1 In flight compartment :
- on **HYD PWR** panel 427VU release Y **ENG 2 PUMPS** pushbutton switch and make certain that G **ENG 2 PUMPS** pushbutton switch is pressed (in).

2 Dry motor engine 2 (Ref. 71-00-00, P. Block 501).

3 Repeat same operations as for engine 1 dry-motoring.

4 Stop engine 2 dry-motoring.

5 Open and close nose landing gear and main landing gear doors (Ref. 32-12-11, P. Block 301).

6 Operate Green system electric pumps and Green/Blue power transfer unit during approx. 2/3 minutes (Ref. 29-22-00, P. Block 301) and (Ref. 29-23-00, P. Block 301).

(e)Repeat following complete operations three times :

NOTE : At last operation, install a new seal on engine pump.
- partial draining of Green hydraulic system (Ref. Para. (2)(a))
- filling of reservoir and engine pump suction line (Ref. Para. (2)(b))
- dry-motoring of engine 1 and engine 2 (Ref. Para. (2)(c)).

(f)Bleed hydraulic fluid from each Normal brake and line downstream of servo valves (Ref. 32-42-00, P. Block 301).

(g)Fill Green reservoir to normal level of 17 liters (4.49 US Gal) nominal value.

(4)Replacement of fluid (second stage)

NOTE : Following procedure must be done after one-week operation interval.

(a)Partial draining of Green hydraulic system (Ref. Para. (2)(a)).

(b)Filling of reservoir and engine pump suction line with new fluid (Ref. Para. (3) (b)) with flight control movements.

(c)Engine 1 and engine 2 dry-motoring (Ref. 71-00-00, P. Block 501) with flight control movements.

NOTE : At last operation install a new seal on engine pump.

(5)Close-up

(a)In hydraulics compartment place Green system isolation valves (F, G, H) in closed position.
(b)In flight compartment check that :
- on **HYD PWR** panel 427VU the four **ENG PUMPS** pushbutton switches are pressed (in).
- On **SERVO CTL** section of panel 428VU, the **B, G** and Y pushbutton switches are pressed (in).

(c)De-energize aircraft electrical network (Ref. 24-41-00, P. Blocl 301).
(d)Disconnect tools and equipment and restore systems to normal operating condition.
(e)Remove warning notices.
(f)Wipe-up any spilled hydraulic fluid.
(g)Make certain that working area is clean and clear of tools and miscellaneous items of equipmernt.
(h)Close access doors to ground connectors.
(j)Close engine fan cowl doors (Ref. 71-13-00, P. Block 301).
(k)Remove access platform.
(l)Check fluid level in Green reservoir. Top up as required (Ref. 12-12-29, P. Block 1).

C. Replacement of Hydraulic Fluid in Blue System

CAUTION : DO NOT DEPRESSURIZE THE ENGINE PUMPS DURING THE DRY MOTORING. IF YOU DO, YOU CAN CAUSE DAMAGE TO THE ENGINE PUMPS.

R (Ref. Fig. 004)

(1)Equipment and materials

ITEM	DESIGNATION
(a)	Warning Notices
(b)	Container
(c)	Access Platform, 2.60 m (8 ft. 6 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 12-32-29, P. Block 1	Hydraulic Fluid
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 27-50-00, P. Block 301	Flaps
- 27-60-00, P. Block 301	Electrical and Mechanical Control (Spoilers and Speedbrakes)
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-00-00, P. Block 301	General
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 71-00-00, P. Block 501	Engine Dry-Motoring
- 71-13-00, P. Block 301	Cowl Doors

(2) Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 401). Make certain that electronics rack ventilation is correct.

(b)Open RH main landing gear door (Ref. 32-12-11, P. Block 301).

(c)Depressurize Blue hydraulic system (Ref. 29-10-00, P. Block 301).

(d)Depressurize Blue system reservoir (Ref. 29-14-00, P. Block 301).

(e)In flight compartment, display warning notice prohibiting operation of electric pump and power transfer unit.

(f)On ground service panel, display warning notice prohibiting pressurization of Blue hydraulic system with ground power cart.

(g)Open engine fan cowl doors (Ref. 71-13-00, P. Block 301).

(h)On HYD PWR section of panel 471VU, check that fire valves of the three hydraulic systems are open.

(j)On SERVO CTL section of panel 428VU, make certain that B pushbutton switch is pressed (in).

(k)Take all appropriate safety and technical precautions (Ref. 29-00-00, P. Block 301).

(l)Position access platform.

(3)Replacement of fluid

NOTE : Replacement of fluid includes following actions :

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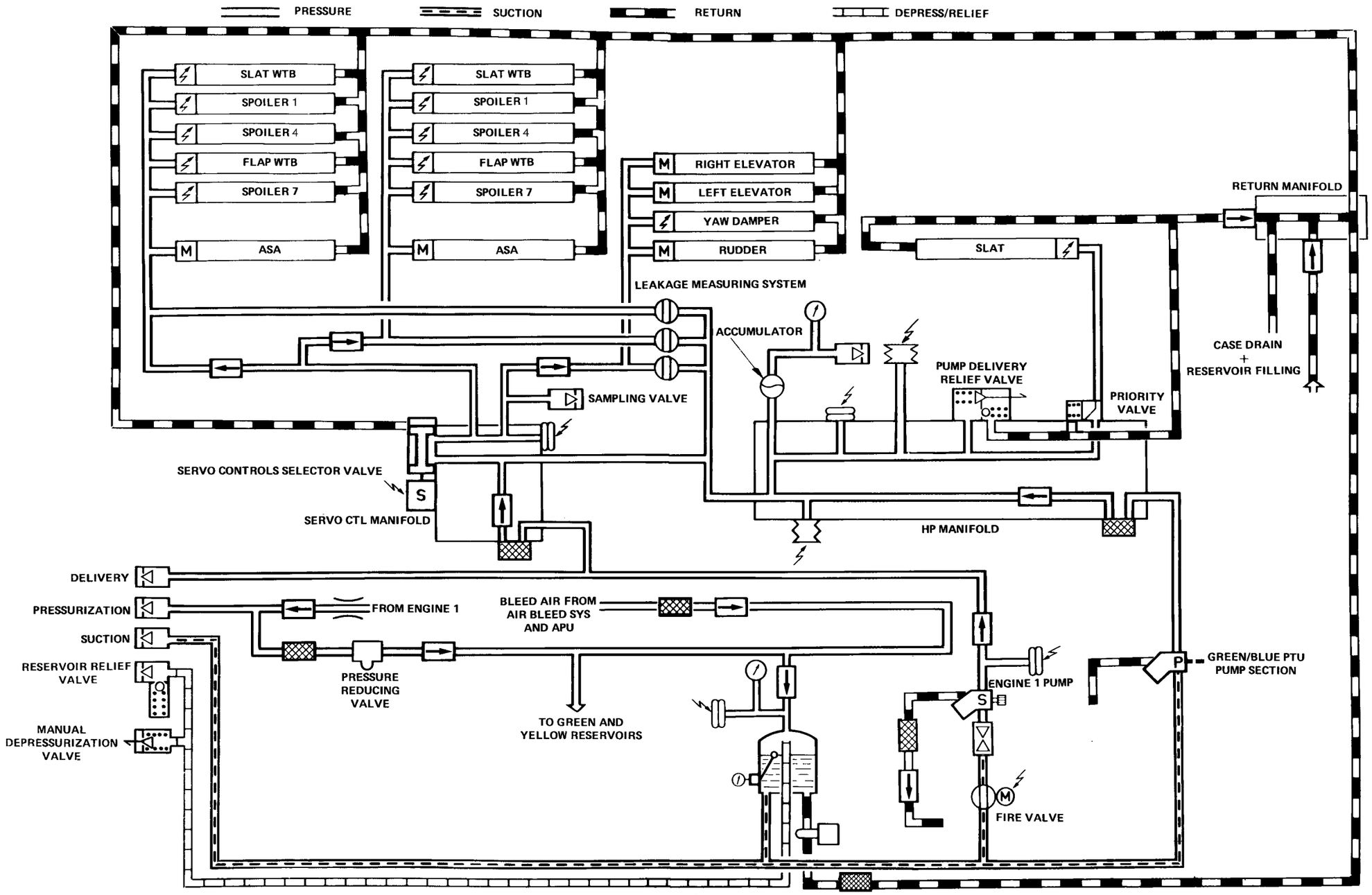

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Blue Hydraulic System
Figure 004

R

- partial draining of system,
- filling of system,
- engine dry-motoring with flight control movements to mix fluid in engine pump line.

NOTE : Blue hydraulic system capacity is approximately 85 liters (22.5 US Gal).

(a)Partial draining of Blue hydraulic system

1 In engine 1, disconnect suction hose at self-sealing connection on engine pump.
2 Remove union from pump suction port and install a plug on pump suction port.
3 Install a recovery container under hydraulic suction hose.
4 Pressurize Blue hydraulic system to 0.5 bars (7.3 psi) (Ref. 29-14-00, P. Block 301).
5 Slowly screw removed union onto self-sealing connection to open it and completely drain fluid from reservoir and suction line into recovery container.

(b)Filling of hydraulic system

1 Remove union from self-sealing connection.
2 Fill hydraulic reservoir with 12 liters (3.168 US Gal).
3 Slowly screw union on self-sealing connection until fluid flows without air bubbles.
4 Unscrew union from self-sealing connection.
5 Remove plug from engine pump and install union with new packing if necessary.
6 Connect hydraulic suction hose to engine pump.
7 Check hydraulic level, add between 8 liters and 10 liters (2.112 and 2.644 US Gal), if necessary.
8 Bleed engine pump and suction line (Ref. 29-11-32, P. Block 401).
9 Check hydraulic level and refill to normal level if necessary.

(c)Engine 1 dry-motoring

NOTE : During engine dry-motoring, check hydraulic connection on engine pylon for leakage.

1 In hydraulics compartment, place Blue system isolation valves (F, G and H) in open position.
2 In flight compartment :
- on HYD PWR panel 427VU, release ENG PUMPS pushbutton switch,
- make certain that B ENG1 PUMPS pushbutton switch is pressed (in).

3 Dry motor engine 1 (Ref. 71-00-00, P. Block 501).
4 Perform following operations :
- move flap/slat control lever on center pedestal to fourth notch and return to first notch (Ref. 27-50-00, P. Block 301) and (Ref. 27-80-00, P. Block 301).
- fully cycle aileron, rudder and elevator servo controls twice (Ref. 27-31-00, P. Block 501) (Ref. 27-21-00, P. Block 501) and (Ref. 27-11-00, P. Block 501).
- cycle spoilers and speedbrakes once (Ref. 27-60-00, P. Block 301).

5 Stop engine 1 dry-motoring.
6 Operate power transfer unit during 2/3 minutes (Ref. 29-22-00, P. Block 301).

(d)Repeat following complete operations three times :

NOTE : At last operation, install a new seal on engine pump.
- partial draining of Blue hydraulic system (Ref. Para. (2)(a)),
- filling of reservoir and engine pump suction line (Ref. Para. (b)),
- dry-motoring of engine 1 (Ref. Para. (c)).

NOTE : Fill Blue reservoir to normal level of 12 liters (3.168 US Gal).

(4)Close-up
(a)In hydraulics compartment, place Blue system isolation valves (F, G and H) in closed position.
(b)In flight compartment, check that :
- on HYD PWR panel 427VU, the four ENG PUMPS pushbutton switches are pressed (in),
- on SERVO CTL section of panel 428VU, B, G and Y pushbutton switches are pressed (in).

(c)De-energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)Disconnect tools and equipment and restore systems to normal operating condition.
(e)Remove warning notices.
(f)Wipe-up any spilled hydraulic fluid.
(g)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(h)Close access doors to ground connectors.
(j)Close engine fan cowl doors (Ref. 71-13-00, P. Block 301).
(k)Remove access platform.
(l)Check fluid level in Blue reservoir.
Top-up as required (Ref. 12-12-29, P. Block 1).

D. Replacement of Hydraulic Fluid in Yellow System

CAUTION : DO NOT DEPRESSURIZE THE ENGINE PUMPS DURING THE DRY MOTORING. IF YOU DO, YOU CAN CAUSE DAMAGE TO THE ENGINE PUMPS.

R (Ref. Fig. 005)

(1)Equipment and materials

ITEM	DESIGNATION
(a)	Warning Notices
(b)	Container
(c)	Access Platform, 2.60 m (8 ft. 6 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 12-32-29, P. Block 1	Hydraulic Fluid
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 27-50-00, P. Block 301	Flaps
- 27-60-00, P. Block 301	Electrical and Mechanical Control (Spoilers and Speedbrakes)
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-00-00, P. Block 301	General
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-23-00, P. Block 301	Yellow Auxiliary Power
- 71-00-00, P. Block 501	Engine Dry-Motoring
- 71-13-00, P. Block 301	Cowl Doors

(2) Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 401). Make certain that electronics rack ventilation is correct.

(b)Open RH main landing gear door (Ref. 32-12-11, P. Block 301).

(c)Depressurize Yellow hydraulic system (Ref. 29-10-00, P. Block 301).

(d)Depressurize Yellow system reservoir (Ref. 29-14-00, P. Block 301).

(e)In flight compartment, display warning notice prohibiting operation of electric pump and power transfer unit.

(f)On ground service panel, display warning notice prohibiting pressurization of Yellow hydraulic system with ground power cart.

(g)Open engine fan cowl doors (Ref. 71-13-00, P. Block 301).

(h)On HYD PWR section of panel 471VU, check that fire valves of the three hydraulic systems are open.

(j)On SERVO CTL section of panel 428VU, make certain that Y pushbutton switch is pressed (in).

(k)Take all appropriate safety and technical precautions (Ref. 29-00-00, P. Block 301).

(l)Position access platform.

(3)Replacement of fluid

NOTE : Replacement of fluid includes following actions :

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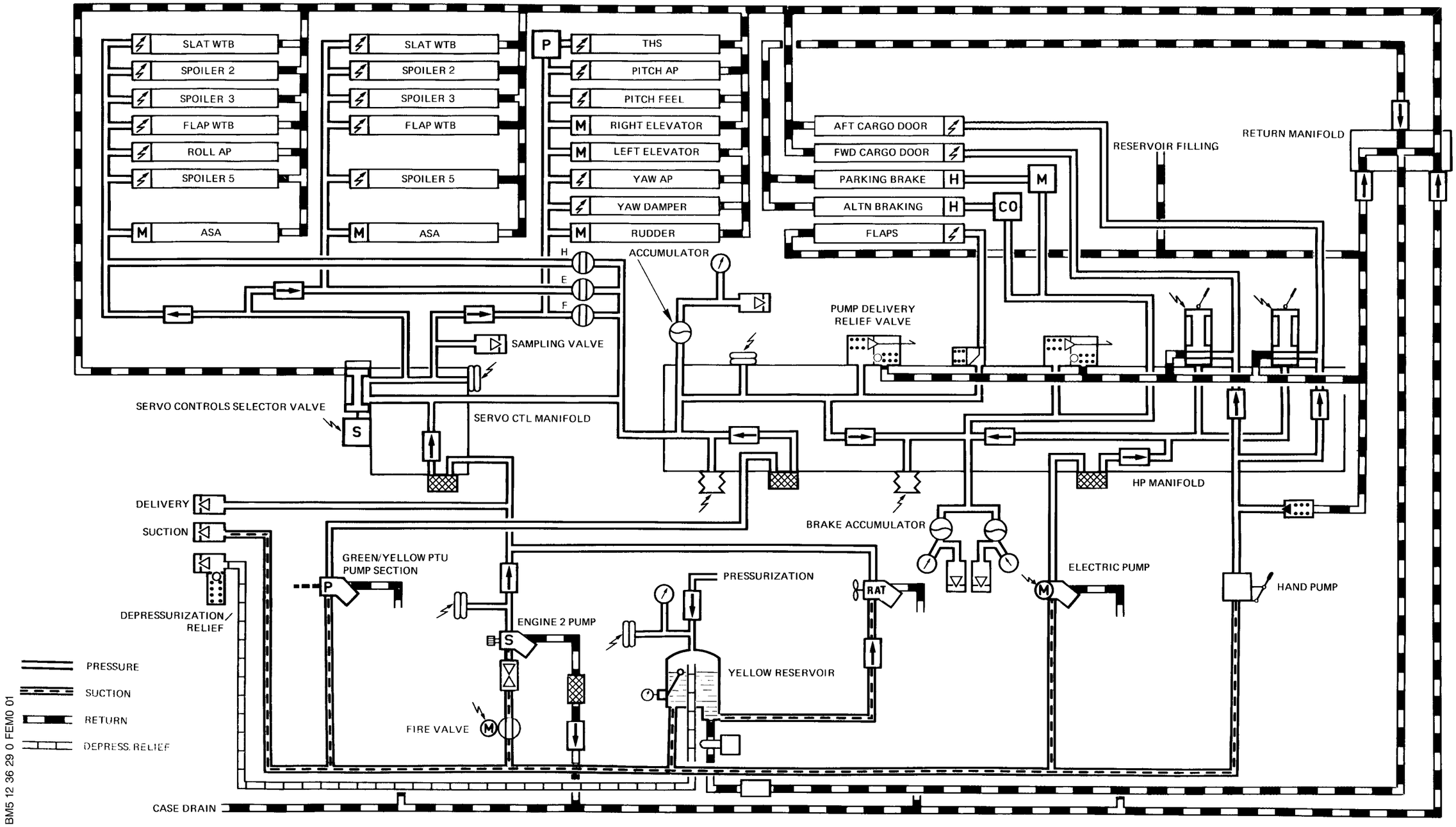


Yellow Hydraulic System
Figure 005

R

- partial draining of system,
- filling of system,
- engine dry-motoring with flight control movements to mix fluid in engine pump line.

NOTE : Yellow hydraulic system capacity is approximately 120 liters (31.7 US Gal).

(a)Partial draining of Yellow hydraulic system

1 In engine 2, disconnect suction hose at self-sealing connection on engine pump.
2 Remove union from pump suction port and install a plug on pump suction port.
3 Install a recovery container under hydraulic suction hose.
4 Pressurize Yellow hydraulic system to 0.5 bars (7.3 psi) (Ref. 29-14-00, P. Block 301).
5 Slowly screw removed union onto self-sealing connection to open it and completely drain fluid from reservoir and suction line into recovery container.

(b)Filling of hydraulic system

1 Remove union from self-sealing connection.
2 Fill hydraulic reservoir with 12 liters (3.168 US Gal).
3 Slowly screw union on self-sealing connection until fluid flows without air bubbles.
4 Unscrew union from self-sealing connection.
5 Remove plug from engine pump and install union with new packing if necessary.
6 Connect hydraulic suction hose to engine pump.
7 Check hydraulic level, add between 8 liters and 10 liters (2.112 and 2.644 US Gal), if necessary.
8 Bleed engine pump and suction line (Ref. 29-11-32, P. Block 401).
9 Check hydraulic level and refill to normal level if necessary.

(c)Engine 2 dry-motoring

NOTE : During engine dry-motoring, check hydraulic connection on engine pylon for leakage.

1 In hydraulics compartment, place Yellow system isolation valves (F, G and H) in open position.
2 In flight compartment :
- on HYD PWR panel 427VU, release G ENG PUMPS pushbutton switch,
- make sure that Y ENG2 PUMPS pushbutton switch is pressed (in).

3 Dry motor engine 2 (Ref. 71-00-00, P. Block 501).
4 Perform following operations :
- open and close forward cargo compartment door twice, using Yellow system electric pump (Ref. 52-33-00, P. Block 1).
- open and close aft cargo compartment door twice, using Yellow system electric pump (Ref. 52-33-00, P. Block 1).
- move flap/slat control lever on center pedestal to third notch (FLAPS 15°) and return to first notch (Ref. 27-50-00, P. Block 301 and 27-80-00, P. Block 301).
- fully cycle aileron, rudder and elevator servo controls twice (Ref. 27-31-00, P. Block 501) (Ref. 27-21-00, P. Block 501) and (Ref. 27-11-00, P. Block 501).
- operate trimmable horizontal stabilizer for a few seconds, once

(Ref. 27-41-00, P. Block 501).
- cycle speedbrakes and spoilers once (Ref. 27-60-00, P. Block 501).
- apply and release parking brake (Ref. 32-45-00, P. Block 501) three times.
- apply brakes (ALTN mode) three times (Ref. 32-43-00, P. Block 501).

5 Stop engine 2 dry-motoring.

6 Operate power transfer unit during a few seconds (Ref. 29-23-00, P. Block 301).

(d)Repeat following complete operations twice :
- partial draining of Yellow hydraulic system (Ref. Para. (2)(a)).
- filling of reservoir and engine pump suction line (Ref. Para. (2)(b)).
- dry-motoring of engine 2 (Ref. Para. (2)(c)).

NOTE : Fill Yellow reservoir to normal level of 18.5 liters (4.884 US Gal).

(4)Close-up
(a)In hydraulics compartment, place Yellow system isolation valves (F, G and H) in closed position.
(b)In flight compartment check that :
- on HYD PWR panel 427VU, the four ENG PUMPS pushbutton switches are pressed (in),
- on SERVO CTL section of panel 428VU, B, G and Y pushbutton switches are pressed (in).

(c)De-energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)Disconnect tools and equipment and restore systems to normal operating condition.
(e)Remove warning notices.
(f)Wipe-up any spilled hydraulic fluid.
(g)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(h)Close access doors to ground connectors.
(j)Close engine fan cowl doors (Ref. 71-13-00, P. Block 301).
(k)Remove access platform.
(l)Check fluid level in Yellow reservoir.
Top-up as required (Ref. 12-12-29, P. Block 1).

WHEEL REPLACEMENT

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

1. Nose Gear Wheel (Ref. Fig. 001)

A. Reasons for the Job
(1)Removal for lubrication of bearings.
(2)Removal for tire replacement.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)C22971	Jack Adaptor
	(2)	Main Gear Wheel Chocks
	(3)	Nose Gear Wheel Chocks
	(4)98A32001001200	Adaptor - Gear Wheel Positioning on Dolly Hoist
	(5)C47261	Adaptor
	(6)C47578	Protector
	(7)	Torque Wrench 0 to 30 m.daN (0 to 221 lbf.ft.)
	(8)Material No. 04-001	Common Greases (Ref. 20-31-00)
R	(9)Material No. 04-022	Common Greases (Ref. 20-31-00)
R	10)Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
R	11)Material No. 11-026	Cleaning Agents (Ref. 20-31-00)
	12)	Corrosion Resistant Steel Lockwire Dia. 0.8 mm (0.032 in.)
	Referenced Procedures	
	- 07-12-00, P. Block 1	Jacking for Wheel Change
	- 12-14-32, P. Block 1	Landing Gear Inflating and Charging
	- 32-41-00, P. Block 601	Wheel Inspection/Check

C. Procedure
(1)Job set-up
(a)Position main gear wheel chocks.
(b)Make certain that **PARKING BRAKE** control handle is in Normal (released) position.

CAUTION : DURING REFUELING OR DEFUELING PROCEDURES, DO NOT DO THIS JACKING FOR WHEEL CHANGE PROCEDURE. IF THE AIRCRAFT IS ON JACKS AND IF A FIRE OR IMPORTANT FUEL SPILLAGE OCCURS, IT WILL NOT BE POSSIBLE TO MOVE THE AIRCRAFT.

(c)Jack nose gear wheels clear of ground (Ref. 07-12-00, P. Block 1)
1 If necessary, install jack adaptor at front towing fitting and jacking point at base of sliding tube.
2 Position jack pad directly below adaptor ball.
3 Turn jack screw to bring jack pad and adaptor ball into contact.
4 Check stability of jack set-up.
NOTE : When adaptor is not used, position jack directly below jacking point at base of sliding tube.
5 Jack wheels clear of ground.

(d)Fully deflate tire of wheel to be removed.

NOTE : If you must remove wheel for access, it is not necessary to deflate tire in the following conditions :
- tire is in the correct condition and
- tire pressure is in the Normal Operating Range (Ref. TASK 32-41-00 P. Block 601).

If you have not these two conditions, you must deflate tire.

(e)Cut and remove lockwire and remove screws (1), washers (2).

(f)Remove shroud assy.

CAUTION : DRAW SHROUD ASSY. ALONG WHEEL AXLE CENTERLINE TO AVOID DAMAGING TACHOMETER DRIVE SHAFT.

(2)Removal

(Ref. Fig. 001)

(a)Remove cotter pins (6), nuts (5), washers (4) and bolts (3).

(b)Remove wheel retaining nut (8) using adaptor C47261.

NOTE : ALS Part 1 item, nut must be replaced by a new one every time it is removed from the wheel axle. When the nut is temporarily removed and reinstalled for the purpose of performing maintenance outside a workshop, no replacement is required provided the nut's removal and reinstallation are performed on the same aircraft MSN and neither the aircraft MSN nor the nut accumulates time in service during the period between the removal and reinstallation.

(c)Install axle protector C47578.

(d)Remove wheel using dolly hoist 98A32001001200.

NOTE : Wheel assembly weighs 85 kg (187 lbs.).

(3)Preparation before installation

NOTE : If the wheel is equipped with pressure sensor holder, make sure that the seal cap is properly installed and secured with nut and cotter pin.

R NOTE : Do not mix lithium and clay thickened grease.
R Clean and degrease the parts before you use Material No. 04-022.

R (a)Clean axle with Material No. 11-002 or Material No. 11-026, dry with filtered compressed air, then apply a light coat of grease, Material
R No. 04-001 or Material No. 04-022.

NOTE : If possible, for lubricating the axle sleeve, use the same grease than the grease that was used in shop for greasing the bearing. In this case, (to lubricate the bearing and the axle sleeve) the excess of grease taken from the bearings can be used to lubricate the axle sleeve.

Furthermore clean tachometer drive shaft splines on shroud assy. with
R Material No. 11-002 or Material No. 11-026 then apply a light coat of
R grease, Material No. 04-022.

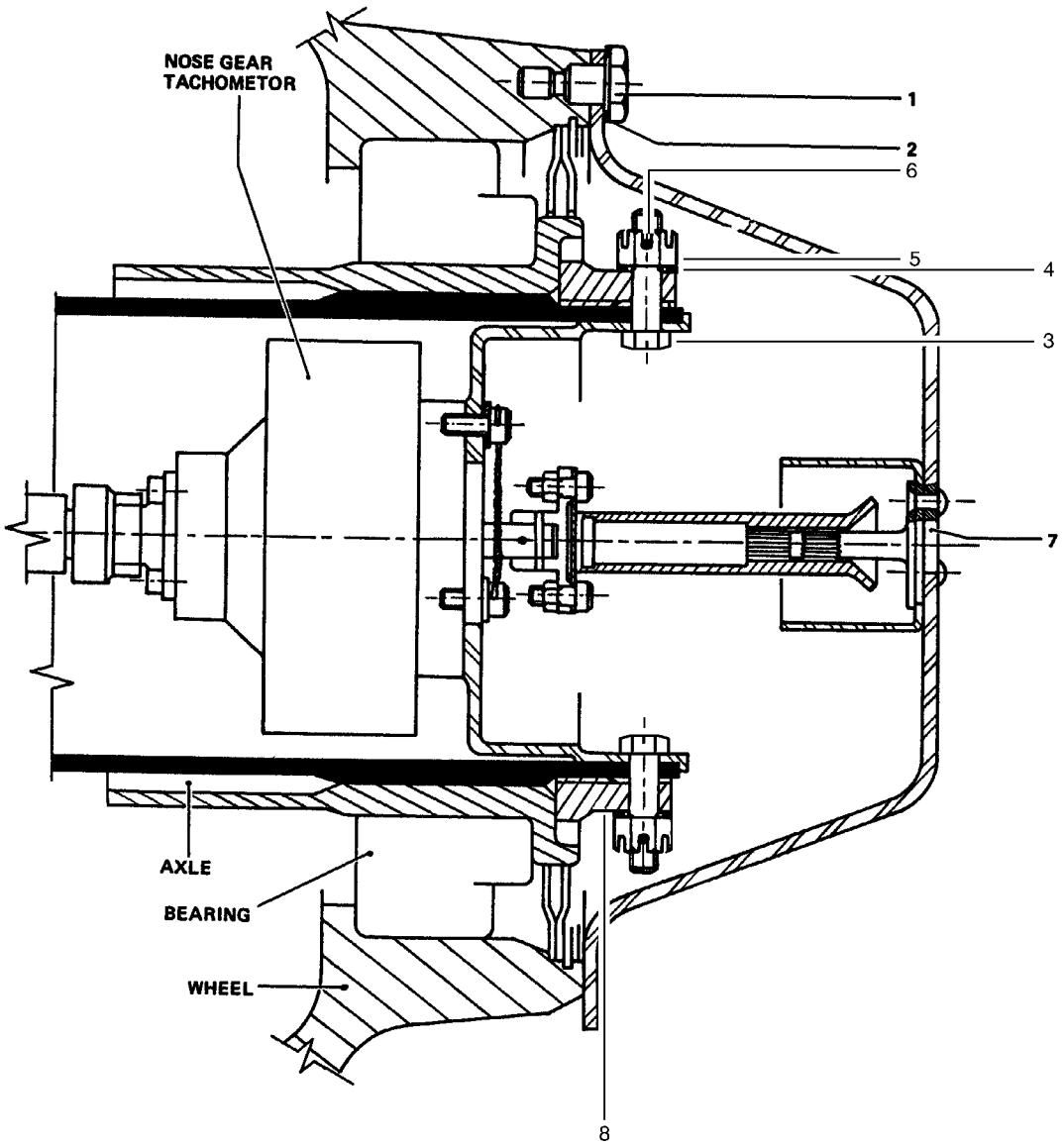
(4)Installation

R NOTE : Do not mix lithium and clay thickened grease.
R Clean and degrease the parts before you use Material No. 04-022.

(a)Using dolly hoist, position wheel, with valve facing outboard, on tapered section of axle protector and push wheel fully home.

(b)Remove axle protector C47578.

R (c)Lightly grease axle thread with Material No. 04-022.



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Nose Gear Wheel
Figure 001

R

(d)Install nut (8) using adaptor C47261.

NOTE : ALS Part 1 item, nut must be replaced by a new one every time it is removed from the wheel axle. When the nut is temporarily removed and reinstalled for the purpose of performing maintenance outside a workshop, no replacement is required provided the nut's removal and reinstallation are performed on the same aircraft MSN and neither the aircraft MSN nor the nut accumulates time in service during the period between the removal and reinstallation.

R NOTE : Grease face of nut (8) in contact with spacer with Material No. 04-001 or Material No. 04-022.

While manually rotating wheel, TORQUE nut (8) to between 17 and 21 m.daN (125.4 and 154.8 lbf.ft.).

(e)Check that wheel rotates freely.

CAUTION : BOLT HEADS SHALL BE INSTALLED INSIDE AXLE.

(f)Install bolts (3), washers (4), nuts (5) and cotter pins (6).

(g)Position shroud assy. (7) and install with washers (2) and screws (1). TORQUE screws (1) to between 0.6 and 0.7 m.daN (53.08 and 61.92 lbf.in.). Wirelock screws (1).

(h)Inflate tire of wheel installed (Ref. 12-14-32, P. Block 1).

(5)Close-up

(a)Lower the aircraft onto its wheels (Ref. 07-12-00, P. Block 1)

(b)Position nose gear wheel chocks.

2. Main Gear Wheels

CAUTION : - DO NOT LIFT FRONT PART OF BOGIE BEAM TO AN EXCESSIVE HEIGHT AS THIS COULD RESULT IN DAMAGE TO PITCH DAMPER.
- IF ALL FOUR TIRES ON LEFT OR RIGHT MAIN GEAR ARE FLAT, REPLACE WHEELS ON REAR AXLE FIRST.
- IF THESE INSTRUCTIONS ARE NOT ADHERED TO, PITCH DAMPER MAY REACH ITS INTERNAL STOPS AND CONSEQUENTLY BE SUBJECTED TO EXCESSIVE LOADS WITH SUBSEQUENT DAMAGE TO PITCH DAMPER.

WARNING : YOU MUST NOT PUT TOO MUCH GREASE ON THE AXLE SLEEVE. A VERY HOT BRAKE CAN CAUSE THE GREASE TO BURN AND CAUSE A FIRE.

A. Reasons for the Job
(1)Removal for tire replacement or lubrication of bearings.
(2)Removal to gain access to brake unit (Check or replacement of components).
(3)Removal for removal of brake unit.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Nose Gear Wheel Chocks
	(2)	Main Gear Wheel Chocks
	(3)H47682	Adaptor
	(4)98A32001001200	Adaptor - Gear Wheel Positioning on Dolly Hoist
	(5)F46754-1000	Axle Thread Protector
	(6)D21846-1000	Disk Centering Tool
	(7)F46909-1001	Spacer
	(8)F46083	Nut
	(9)Material No. 04-022	Common Greases (Ref. 20-31-00)
	10)Material No. 04-001	Common Greases (Ref. 20-31-00)
R	11)Material No. 04-003	Common Greases (Ref. 20-31-00)
R	12)Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
R	13)Material No. 11-026	Cleaning Agents (Ref. 20-31-00)
	14)	Warning Notice
	Referenced Procedures	
	- 07-12-00, P. Block 1	Jacking for Wheel Change
	- 12-14-32, P. Block 1	Landing Gear Inflating and Charging
	- 32-41-00, P. Block 601	Wheel Inspection/Check
R	- 32-42-27, P. Block 601	Brake Unit (1338 to 1345)

C. Procedure
(1)Job set-up
(a)Position nose gear wheel chocks and chock wheels of main gear not affected.

CAUTION : INCORRECT POSITIONING OF JACK MAY RESULT IN UNREPAIRABLE DAMAGE TO BOGIE BEAM.

(b)Make certain that PARKING BRAKE control handle is in Normal (released) position.

CAUTION : DURING REFUELING OR DEFUELING PROCEDURES, DO NOT DO THIS JACKING FOR WHEEL CHANGE PROCEDURE. IF THE AIRCRAFT IS ON JACKS AND IF A FIRE OR IMPORTANT FUEL SPILLAGE OCCURS, IT WILL NOT BE POSSIBLE TO MOVE THE AIRCRAFT.

(c)Jack main gear wheel axle concerned clear of ground (Ref. 07-12-00, P. Block 1).

CAUTION : PRIOR TO LIFTING BOGIE BEAM FOR REMOVAL OF MLG FRONT WHEELS TAKE THE FOLLOWING PRECAUTIONS.

Several cases can occur.
(Ref. Fig. 002)
(Ref. Fig. 003)

- Rear wheels on the ground properly inflated. Distance between the axle axis and the ground : 520 to 540 mm (20.4 to 21.2 in.) for 49 x 17 tires and 490 to 510 mm (19.3 to 20 in.) for 46 x 16 tires.
  . one or two front wheels are to be replaced (tires not destroyed) The distance between the tire and the ground should not exceed 75 mm (3 in.)
  . one front wheel is to be replaced (tire destroyed) The distance between the tire of the adjacent wheel and the ground should not exceed 75 mm (3 in.)
  . two front wheels are to be replaced (tire destroyed) In such a case, use the axle as a reference. The lifting distance between the axle axis and the ground should not exceed 712 mm (28 in.) for 49 x 17 tires and 667 (26.2 in.) for 46 x 16 tires
- The two front wheels and the two rear wheels are to be replaced. First replace the two rear wheels (an absolute requirement) and then replace the two front wheels, as indicated above.

NOTE : Maximum lifting heights indicated above include a safety clearance of approximately 25 mm (1 in.).

1 Position jack pad directly below bogie beam jacking point.
2 Turn jack screw to bring jack pad and bogie beam ball into contact.
3 Check stability of jack set-up.
4 Jack wheel clear of ground.

(d)Fully deflate tire of wheel to be removed.

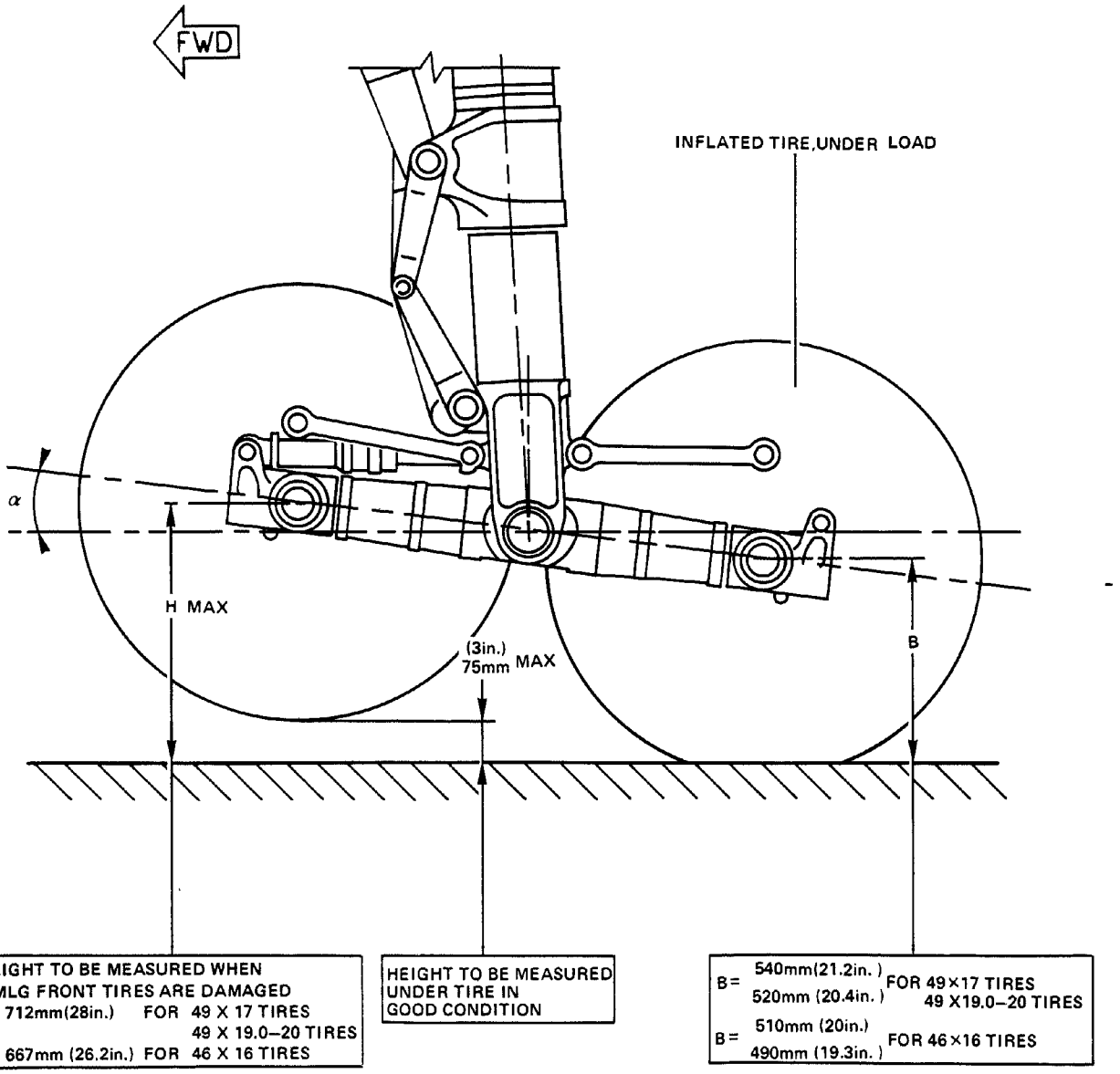
NOTE : If you must remove wheel for access, it is not necessary to deflate tire in the following conditions :
- tire is in the correct condition and
- tire pressure is in the Normal Operating Range (Ref. TASK 32-41-00 P. Block 601).

If you have not these two conditions, you must deflate tire.

(e)Make certain that brake system accumulators are pressurized.
(f)Loosen nut (4) securing clamp (5).
(g)Remove shroud assy (6).

CAUTION : DRAW SHROUD ASSY ALONG WHEEL AXLE CENTERLINE TO AVOID DAMAGING TACHOMETER DRIVE SHAFT.

(Ref. Fig. 004)


FWD
INFLATED TIRE,UNDER LOAD
α
H MAX
(3in.)
75mm MAX
B
HEIGHT TO BE MEASURED WHEN
2 MLG FRONT TIRES ARE DAMAGED
H - 712mm(28in.) FOR 49 X 17 TIRES
49 X 19.0–20 TIRES
H - 667mm (26.2in.) FOR 46 X 16 TIRES
HEIGHT TO BE MEASURED
UNDER TIRE IN
GOOD CONDITION
B= 540mm(21.2in.) / 520mm (20.4in.) FOR 49×17 TIRES 49 X19.0–20 TIRES
B= 510mm (20in.) / 490mm (19.3in.) FOR 46×16 TIRES

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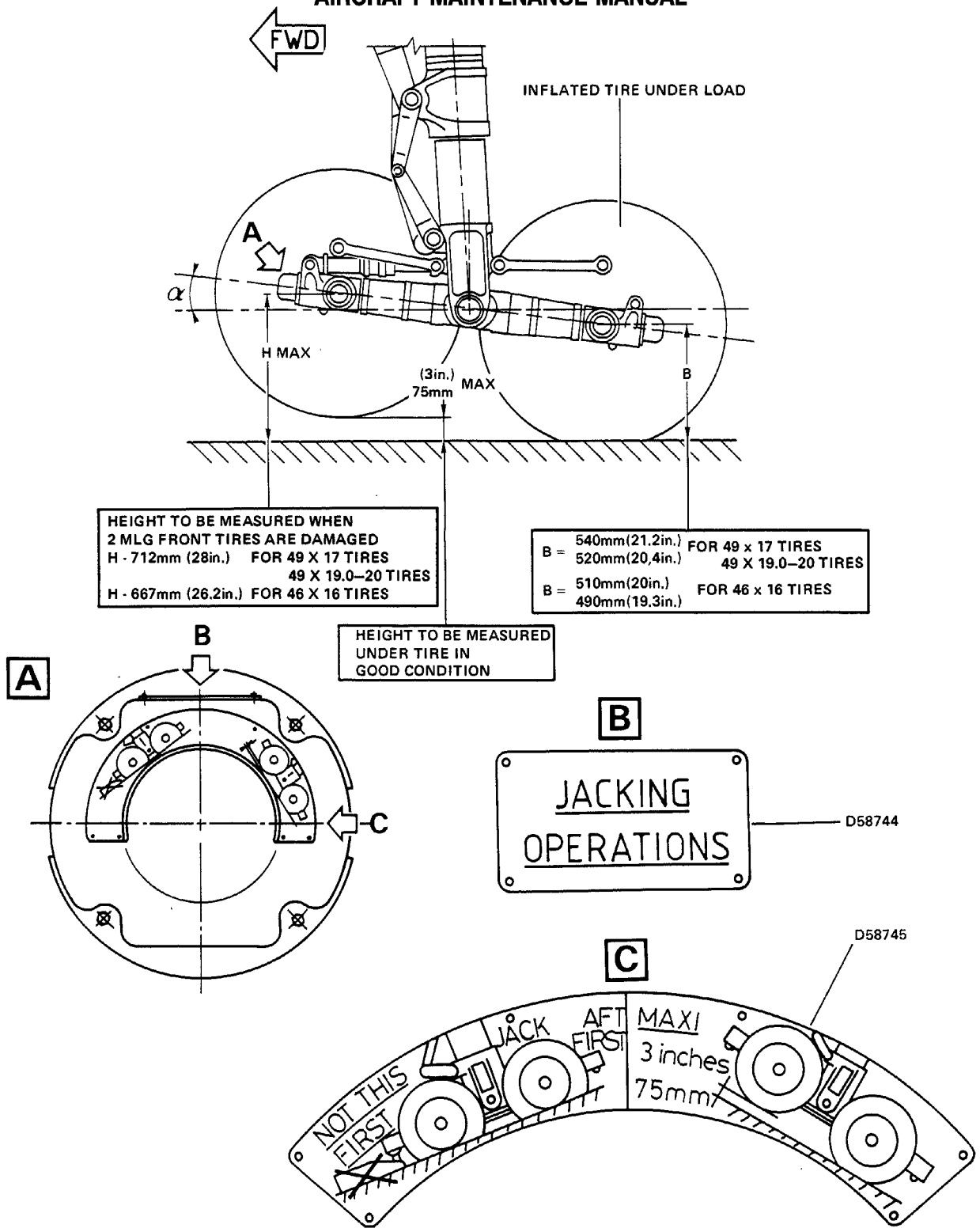
Maximum Heights for Bogie Beam Lifting
Figure 002



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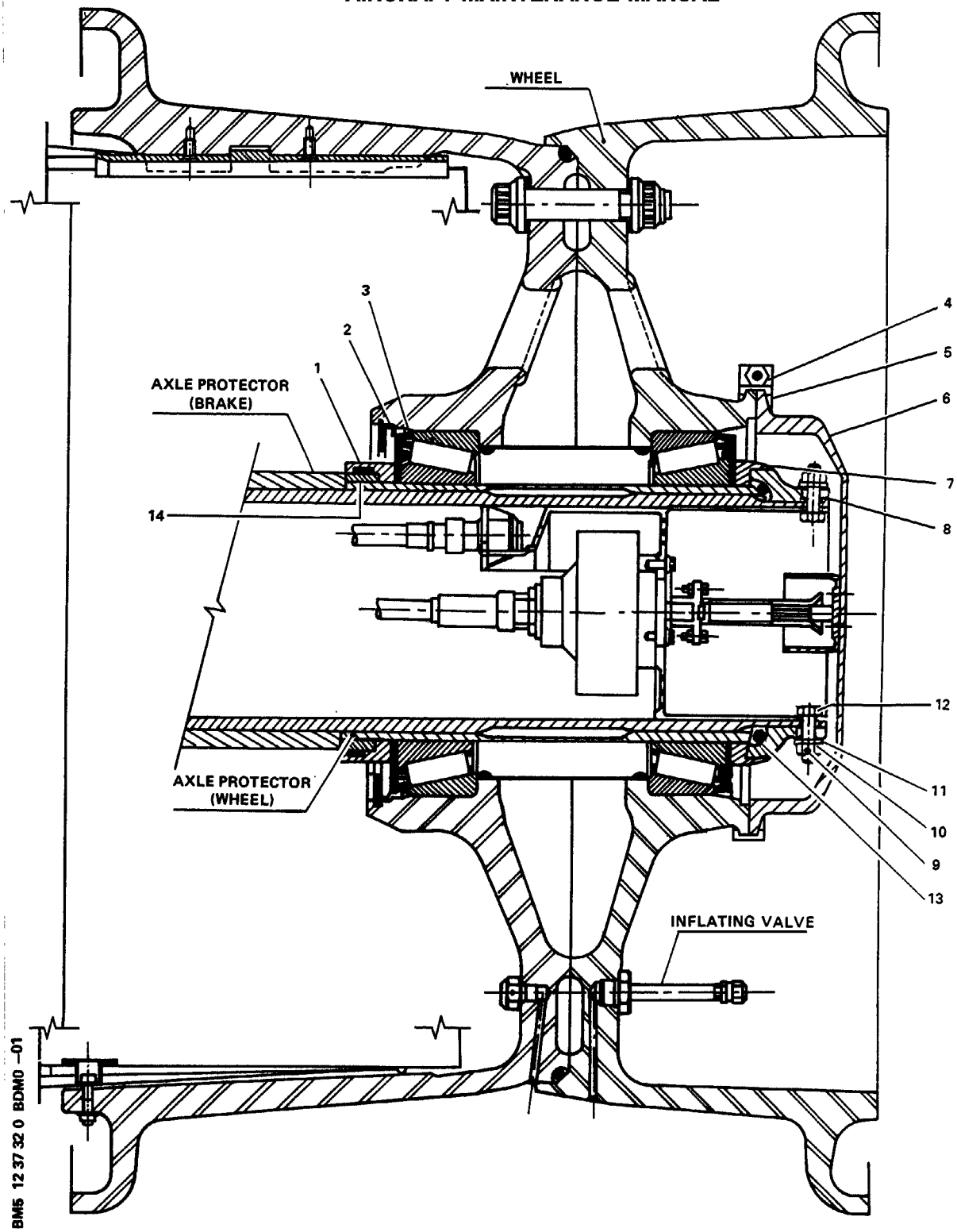
Jacking Operations - Main Landing Gear
Figure 003



Main Gear Wheel
Figure 004

(2)Removal
(a)Pull parking brake to immobilize rotors, thus facilitating wheel removal. The parking brake must remain applied during wheel removal.
NOTE : Display warning notice prohibiting release of parking brake handle during wheel removal/installation.
(b)Remove cotter pins (9), nuts (10), washers (11) and bolts (12).
(c)Remove wheel retaining nut (8) using adaptor H47682.
NOTE : Stop (7) is crimped onto nut (8).
(d)Install axle thread protector F46754-1000.
(e)Remove wheel, using adaptor 98A32001001200.

WARNING : IF PARKING BRAKE HAS BEEN INADVERTENTLY RELEASED, DO NOT :
- MANUALLY ROTATE THE ROTORS
- APPLY PRESSURE TO BRAKE WHEN ROTORS ARE NOT ALIGNED.

WARNING : WHEEL ASSEMBLY WEIGHS 140 KG (308 LBS) APPROX. USE HANDLING EQUIPMENT.

(3)Preparation before installation

WARNING : YOU MUST NOT PUT TOO MUCH GREASE ON THE AXLE SLEEVE. A VERY HOT BRAKE CAN CAUSE THE GREASE TO BURN AND CAUSE A FIRE.
NOTE : If the wheel is equipped with pressure sensor holder, make sure that the seal cap is properly installed and secured with nut and cotter pin.
R NOTE : Do not mix lithium and clay thickened grease.
R Clean and degrease parts before you use Material No. 04-022.
R (a)Clean wheel axle sleeve with Material No. 11-002 or Material
R No. 11-026, then dry with filtered compressed air. Apply light coat of
R Material No. 04-001 or Material No. 04-022.
R NOTE : If possible, for lubricating axle sleeve, use same grease
R as grease that was used in shop for greasing bearing. In this
R case, (to lubricate bearing and axle sleeve) excess of grease
R taken from bearings can be used to lubricate axle sleeve.
- If necessary, shroud assembly drive (6) shaft splines with Material
R No. 11-002 or Material No. 11-026.
- Clean and visually check the splines of tachometer drive shaft and debris guard adaptor at every wheel replacement. If wear is found too important (splines erased or backlash in rotation too important between male and female splined parts), drive shaft and fan debris guard must be replaced to avoid braking trouble.
Make certain that bush (14) is correctly fitted on wheel axle sleeve.
- Before reassembly, coat splines of tachometer drive shaft and shroud assy adaptor splines with grease compound Material No. 04-003 only.
(b)If a replacement wheel is to be installed :
- Check positioning and attachment of rotor drives.
- Check positioning of seals (3) and retainers (2).
(c)Where necessary (e.g. following work on brake units), remove wheel axle protector and install disk centering tool.
(d)With disks centered, place PARKING BRAKE control handle in on (applied) position.
NOTE : Check that axle sleeves locking ring (13) is correctly

positioned.
Remove disk centering tool and install wheel axle protector.
(e)Visually inspect component interface and/or adjacent area.
R (f)Do general check of brake unit with wheel removed (Ref. 32-42-27,
R P. Block 601).
(4)Installation
NOTE : Check that axle sleeves locking ring (13) is correctly positioned.
(a)Check positioning of bush (1) equipped with its seal.
(b)Check that bearings are greased (Material No. 04-022 or Material No. 04-001).
(c)Position wheel engaging wheel drive keys in rotors one by one. If parking brake has been inadvertently released, rotors must be aligned by lifting them manually from below.

CAUTION : ENGAGE WHEEL TAKING CARE NOT TO KNOCK ROTORS.
(d)Remove axle thread protector.
(e)Not applicable.
(f)Release parking brake.
(g)Install axle nut (8) equipped with crimped ring (7) using adaptor H47682. While manually rotating wheel, TORQUE nut (8) to between 25 and 30 m.daN (185 and 221 lbf.ft.).
Back off nut to between 5 and 10 m.daN (37 and 74 lbf.ft.) and while manually rotating wheel, TORQUE to 15 m.daN (110 lbf.ft.) and value required to reach first safetying position but do not exceed 18 m.daN (131 lbf.ft.).
(h)Install bolts (12), washers (11), nuts (10) and cotter pins (9).
R CAUTION : BEFORE YOU COMPLETE WHEEL INSTALLATION PROCEDURE, DO A VISUAL
R INSPECTION TO MAKE SURE THAT NO DAMAGE OCCURRED TO PARTS
R DURING PROCEDURE.
R MAKE SURE THAT TACHOMETER DRIVE SHAFT MOVES FREELY.
R MAKE SURE THAT THERE ARE NO SIGNS OF DEFORMATION (TWISTING),
R CORROSION, FRICTION, SCRATCHES AND STAINS :
R - ON DRIVE SHAFT
R - ON SPLINES OF TACHOMETER DRIVE SHAFT
R - ON SPLINES OF TACHOMETER HUBCAP, OR
R - ON SPLINES OF DEBRIS GUARD (IF BRAKE FANS ARE INSTALLED).
R YOU MUST REPLACE ALL DAMAGED PARTS. DAMAGED PARTS WILL
R PREVENT CORRECT ANTI-SKID BRAKING.
R (j)Visually inspect tachometer drive assy for damage. If you find damage,
R replace all damaged parts.
R (k)Manually rotate wheel to check that installation is correct.
R (l)Position shroud assembly (6) taking care to correctly position sleeve in relation to tachometer drive shaft.
R (m)Install clamp (5) and TORQUE nut to between 0.28 and 0.34 m.daN (25 to 30 lbf.in.).
R (n)Inflate tire of installed wheel (Ref. 12-14-32, P. Block 1).
(5)Close-up
(a)Lower the aircraft onto its wheels (Ref. 07-12-00, P. Block 1).
(b)Position main gear wheel chocks.

**ON A/C ALL

Post SB 32-2058 For A/C 101-200,

WHEEL REPLACEMENT

**ON A/C ALL

Post SB 32-2058 For A/C 101-200,

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

R 1. Nose Gear Wheel (Ref. Fig. 001)

**ON A/C ALL

Post SB 32-2058 For A/C 101-200,

A. Reasons for the Job
(1)Removal for lubrication of bearings.
(2)Removal for tire replacement.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)C22971	Jack Adaptor
	(2)	Main Gear Wheel Chocks
	(3)	Nose Gear Wheel Chocks
	(4)98A32001001200	Adaptor - Gear Wheel Positioning on Dolly Hoist
	(5)C47261	Adaptor
	(6)C47578	Protector
	(7)	Torque Wrench 0 to 30 m.daN (0 to 221 lbf.ft.)
	(8)Material No. 04-001	Common Greases (Ref. 20-31-00)
R	(9)Material No. 04-022	Common Greases (Ref. 20-31-00)
R	10)Material No. 04-003	Common Greases (Ref. 20-31-00)
R	11)Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
R	12)Material No. 11-026	Cleaning Agents (Ref. 20-31-00)
R	13)	Corrosion Resistant Steel Lockwire Dia. 0.8 mm (0.032 in.)
	Referenced Procedures	
	- 07-12-00, P. Block 1	Jacking for Wheel Change
	- 12-14-32, P. Block 1	Landing Gear Inflating and Charging
	- 32-41-00, P. Block 601	Wheel Inspection/Check

C. Procedure
(1)Job Set-Up
(a)Position main gear wheel chocks.
(b)Make certain that PARKING BRAKE control handle is in Normal (released) position.

CAUTION : DURING REFUELING OR DEFUELING PROCEDURES, DO NOT DO THIS JACKING FOR WHEEL CHANGE PROCEDURE. IF THE AIRCRAFT IS ON JACKS AND IF A FIRE OR IMPORTANT FUEL SPILLAGE OCCURS, IT WILL NOT BE POSSIBLE TO MOVE THE AIRCRAFT.

(c)Jack nose gear wheels clear of ground (Ref. 07-12-00, P. Block 1).
1 If necessary, install jack adaptor at front towing fitting and jacking point at base of sliding tube.
2 Position jack pad directly below adaptor ball.
3 Turn jack screw to bring jack pad and adaptor ball into contact.
4 Check stability of jack set-up.
NOTE : When adaptor is not used, position jack directly below jacking point at base of sliding tube.
5 Jack wheels clear of ground.
(d)Fully deflate tire of wheel to be removed.
NOTE : If you must remove wheel for access, it is not necessary to deflate tire in the following conditions :
- tire is in the correct condition and
- tire pressure is in the Normal Operating Range (Ref. TASK 32-41-00 P. Block 601).
If you have not these two conditions, you must deflate tire.
(e)Remove screws (1), washers (2).
(f)Remove shroud assy.

CAUTION : DRAW SHROUD ASSY. ALONG WHEEL AXLE CENTERLINE TO AVOID DAMAGING TACHOMETER DRIVE SHAFT.

(2)Removal

**ON A/C ALL

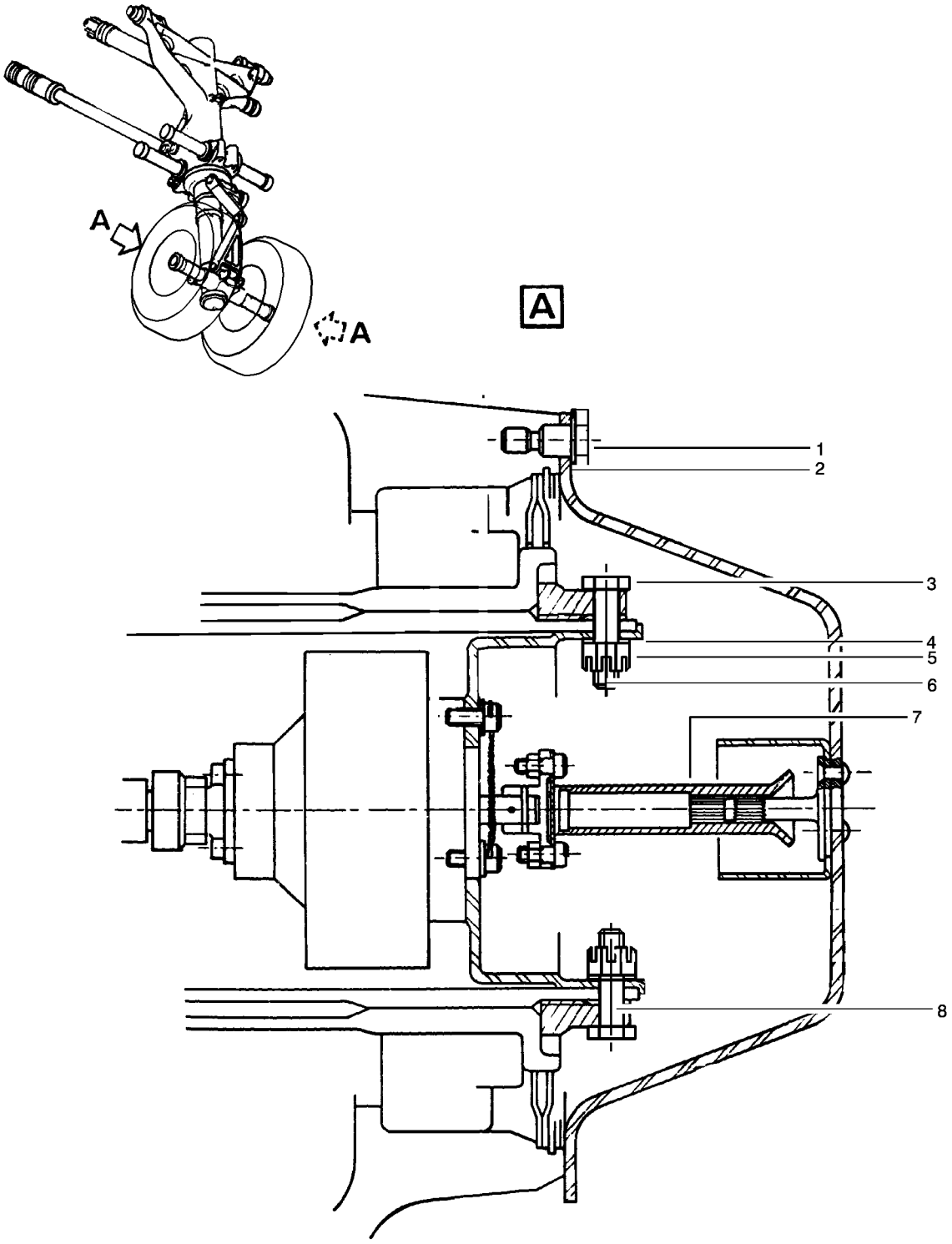
Post SB 32-2058 For A/C 101-200,

R (Ref. Fig. 001)

**ON A/C ALL

Post SB 32-2058 For A/C 101-200,

(a)Remove cotter pins (6), nuts (5), washers (4) and bolts (3).
(b)Remove wheel retaining nut (8) using adaptor C47261.
NOTE : ALS Part 1 item, nut must be replaced by a new one every time it is removed from the wheel axle. When the nut is temporarily removed and reinstalled for the purpose of performing maintenance outside a workshop, no replacement is required provided



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Nose Gear Wheel
Figure 001

R

the nut's removal and reinstallation are performed on the same aircraft MSN and neither the aircraft MSN nor the nut accumulates time in service during the period between the removal and reinstallation.

(c)Install axle protector C47578, inserting tool pins into holes in axle.

(d)Remove wheel using dolly hoist 98A32001001200.

NOTE : Wheel assembly weighs 85 kg (187 lbs).

(3)Preparation before Installation

NOTE : If the wheel is equipped with pressure sensor holder, make sure that the seal cap is properly installed and secured with nut and cotter pin.

R NOTE : Do not mix lithium and clay thickened grease.

R Clean and degrease the parts before you use Material No. 04-022.

R (a)Clean axle with Material No. 11-002 or Material No. 11-026, dry with filtered compressed air, then apply a light coat of grease, Material

R No. 04-001 or Material No. 04-022.

NOTE : If possible, for lubricating the axle sleeve, use the same grease than the grease that was used in shop for greasing the bearing. In this case, (to lubricate the bearing and the axle sleeve) the excess of grease taken from the bearings can be used to lubricate the axle sleeve.

Furthermore clean tachometer drive shaft splines on shroud assy with

R Material No. 11-002 or Material No. 11-026 then apply a light coat of of grease, Material No. 04-003.

(4)Installation

(a)Using dolly hoist, position wheel, with valve facing outboard, on tapered section of axle protector and push wheel fully home.

(b)Remove axle protector C47578.

R (c)Lightly grease axle thread with Material No. 04-022.

(d)Install nut (8) using adaptor C47261.

NOTE : ALS Part 1 item, nut must be replaced by a new one every time it is removed from the wheel axle. When the nut is temporarily removed and reinstalled for the purpose of performing maintenance outside a workshop, no replacement is required provided the nut's removal and reinstallation are performed on the same aircraft MSN and neither the aircraft MSN nor the nut accumulates time in service during the period between the removal and reinstallation.

NOTE : Grease face of nut (8) in contact with spacer with Material

R No. 04-001 or Material No. 04-022.

While manually rotate wheel, TORQUE nut (8) to between 17 and 21 m.daN (125.4 and 154.8 lbf.ft.)

(e)Check that wheel rotates freely.

CAUTION : BOLT HEADS SHALL BE INSTALLED INSIDE AXLE.

(f)Install bolts (3), washers (4), nuts (5) and cotter pins (6).

(g)Position shroud assy (7) and install with washers (2) and screws (1). TORQUE screws (1) to between 0.6 and 0.7 m.daN (53.08 and 61.92 lbf. in.). Wirelock screws (1).

(h)Inflate tire of wheel installed (Ref. 12-14-32, P. Block 1).

(5)Close-Up

(a)Lower the aircraft onto its wheels (Ref. 07-12-00, P. Block 1).
(b)Position nose gear wheel chocks.

**ON A/C ALL

Post SB 32-2058 For A/C 101-200,

2. Main Gear Wheel

CAUTION : - DO NOT LIFT FRONT PART OF BOGIE BEAM TO AN EXCESSIVE HEIGHT AS THIS COULD RESULT IN DAMAGE TO PITCH DAMPER.
- IF ALL FOUR TIRES ON LEFT OR RIGHT MAIN GEAR ARE FLAT, REPLACE WHEELS ON REAR AXLE FIRST.
- IF THESE INSTRUCTIONS ARE NOT ADHERED TO, PITCH DAMPER MAY REACH ITS INTERNAL STOPS AND CONSEQUENTLY BE SUBJECTED TO EXCESSIVE LOADS WITH SUBSEQUENT DAMAGE TO PITCH DAMPER.

WARNING : YOU MUST NOT PUT TOO MUCH GREASE ON THE AXLE SLEEVE. A VERY HOT BRAKE CAN CAUSE THE GREASE TO BURN AND CAUSE A FIRE.

A. Reasons for the Job
(1)Removal for tire replacement or lubrication of bearings.
(2)Removal to gain access to brake unit (check or replacement of components).
(3)Removal for removal of brake unit.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Nose Gear Wheel Chocks
	(2)	Main Gear Wheel Chocks
	(3)98A32001001200	Adaptor - Gear Positioning on Dolly Hoist
	(4)H47682	Adaptor
	(5)	Heat Shield Protector
	(6)F46754-1000	Axle Thread Protector
	(7)MG174-04	Disassembly Tool
	(8)	Torque Wrench
	(9)Material No. 04-001	Common Greases (Ref. 20-31-00)
R	10)Material No. 04-003	Common Greases (Ref. 20-31-00)
R	11)Material No. 04-022	Common Greases (Ref. 20-31-00)
R	12)Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
R	13)Material No. 11-026	Cleaning Agents (Ref. 20-31-00)
	14)	Corrosion Resistant Steel Lockwire Dia. 0.8 mm (0.032 in.)
	15)	Warning Notice
	Referenced Procedures	
	- 07-12-00, P. Block 1	Jacking for Wheel Change
	- 12-14-32, P. Block 1	Landing Gear Inflating and Charging
	- 32-41-00, P. Block 601	Wheel Inspection/Check
R	- 32-42-27, P. Block 601	Brake Unit (1338 to 1345)
	- 32-48-00, P. Block 501	Brake Cooling

ITEM	DESIGNATION
- 32-48-11, P. Block 401	Brake Fan

C. Procedure
(1)Job set-up
(a)Position nose gear wheel chocks and chock wheels of main gear not affected.

CAUTION : INCORRECT POSITIONING OF JACK MAY RESULT IN UNREPAIRABLE DAMAGE TO BOGIE BEAM.

(b)Make certain that PARKING BRAKE control handle is in Normal (released) position.
(c)On panel 400VU
- make certain that ON legend on BRK HOT indicating and fan control pushbutton switch 30GW is off and prohibit its operation by displaying a warning notice.

(d)Open safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	HYDRAULIC/BRAKES/FAN/CTL	17GS	331/V53

(e)Make certain that circuit breaker associated with fan to be removed is open, safetied and tagged

PANEL	SERVICE	IDENT.	LOCATION
133VU	HYDRAULIC/BRAKE FANS/WHEEL/5 & 6	1GS	334/S52
133VU	HYDRAULIC/BRAKE FANS/WHEEL/3 & 4	2GS	335/R55
133VU	HYDRAULIC/BRAKE FANS/WHEEL/1 & 2	3GS	335/R52
133VU	HYDRAULIC/BRAKE FANS/WHEEL/7 & 8	4GS	334/S55

CAUTION : DURING REFUELING OR DEFUELING PROCEDURES, DO NOT DO THIS JACKING FOR WHEEL CHANGE PROCEDURE. IF THE AIRCRAFT IS ON JACKS AND IF A FIRE OR IMPORTANT FUEL SPILLAGE OCCURS, IT WILL NOT BE POSSIBLE TO MOVE THE AIRCRAFT.

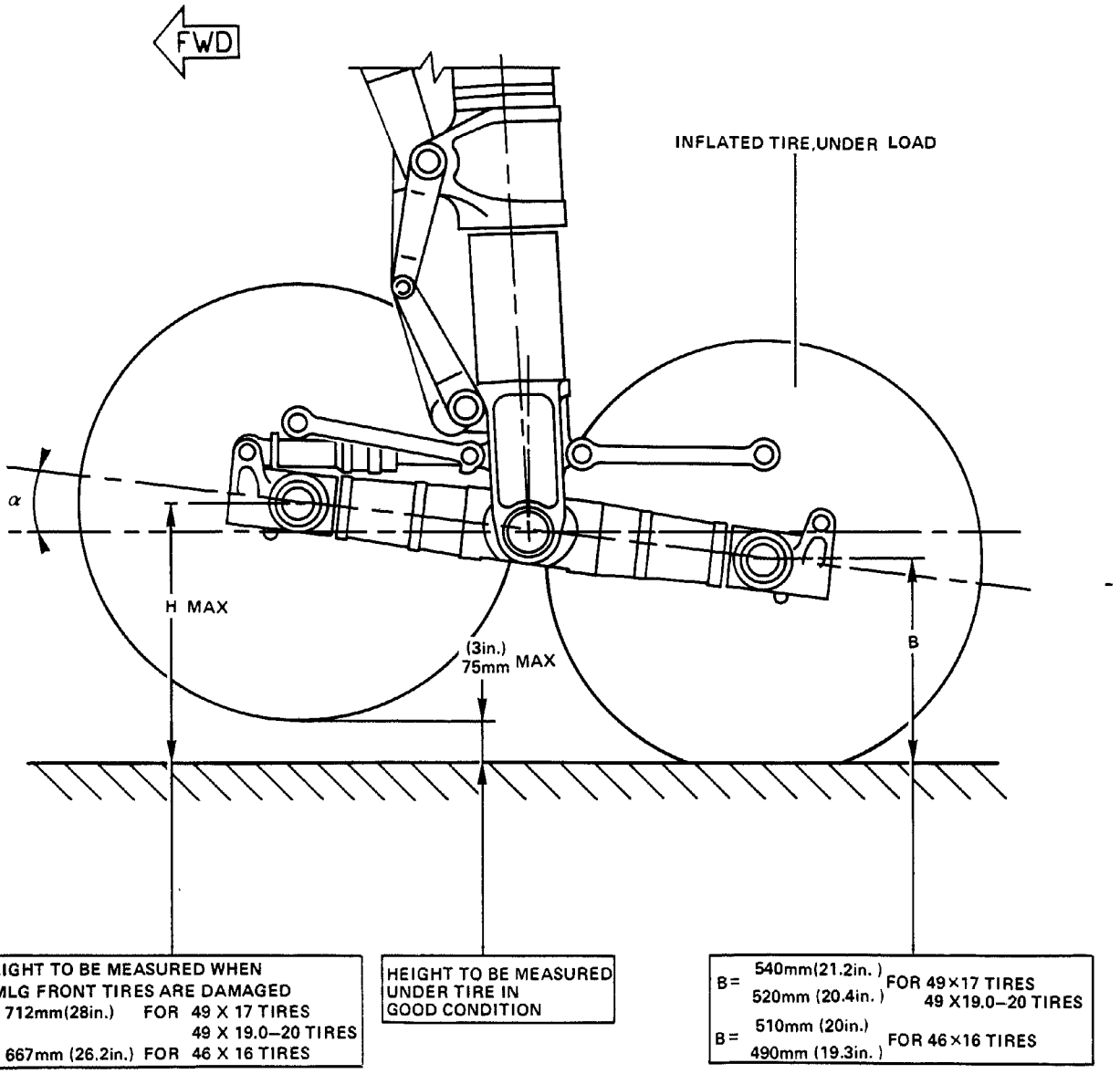
(f)Jack up axle concerned (Ref. 07-12-00, P. Block 1).

CAUTION : PRIOR TO LIFTING BOGIE BEAM FOR REMOVAL OF MLG FRONT WHEELS, TAKE THE FOLLOWING PRECAUTIONS
Several cases may occur.

**ON A/C ALL

Post SB 32-2058 For A/C 101-200,

(Ref. Fig. 002, 003)


FWD
INFLATED TIRE,UNDER LOAD
α
H MAX
(3in.)
75mm MAX
B
HEIGHT TO BE MEASURED WHEN
2 MLG FRONT TIRES ARE DAMAGED
H - 712mm(28in.) FOR 49 X 17 TIRES
49 X 19.0–20 TIRES
H - 667mm (26.2in.) FOR 46 X 16 TIRES
HEIGHT TO BE MEASURED
UNDER TIRE IN
GOOD CONDITION
B= 540mm(21.2in.) / 520mm (20.4in.) FOR 49×17 TIRES 49 X19.0–20 TIRES
B= 510mm (20in.) / 490mm (19.3in.) FOR 46×16 TIRES

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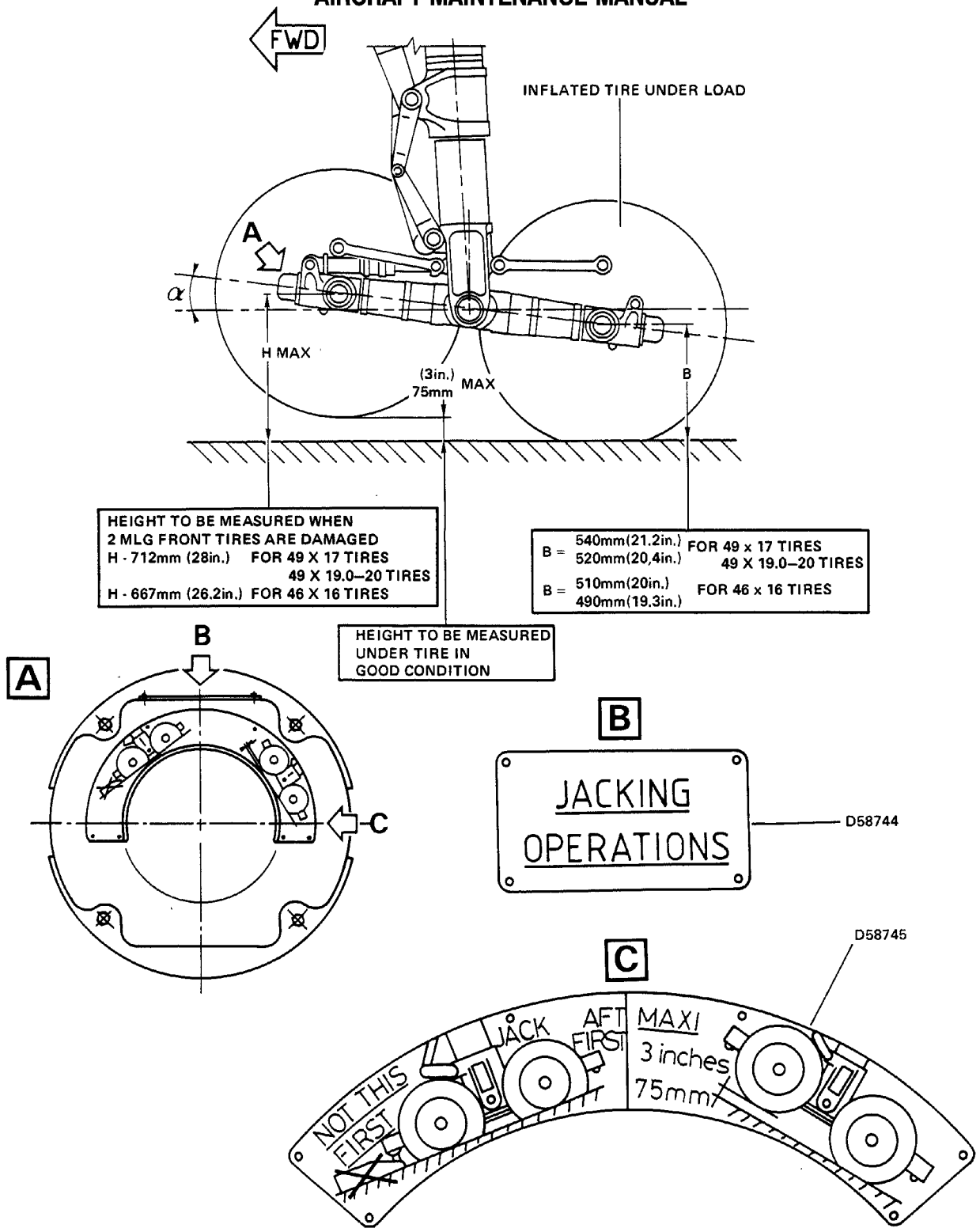
Maximum Heights for Bogie Beam Lifting
Figure 002



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Jacking Operations - Main Landing Gear
Figure 003

**ON A/C ALL

Post SB 32-2058 For A/C 101-200,

- rear wheels on the ground correctly inflated.
  Distance between axle axis and ground : 520 to 540 mm (20.4 to 21.2 in.) for 49 X 17 tires and 49 X 19.0-20 tires and 490 to 510 mm (19.3 to 20 in.) for 46 X 16 tires.
- one or two front wheels are to be replaced (tires not destroyed).
  The distance between tire and ground should not exceed 75 mm (3 in.).
- one front wheel is to be replaced (tire destroyed).
  The distance between tire of the adjacent wheel and ground should not exceed 75 mm (3 in.)
- two front wheels are to be replaced (tires destroyed).
  In such a case, use the axle as a reference. The lifting distance between axle axis and ground should not exceed 712 mm (28 in.) for 49 X 17 tires and 49 X 19.0-20 tires and 667 mm (26.2 in.) for 46 X 16 tires.
- the two front wheels and the two rear wheels are to be replaced
  First replace the two rear wheels (absolute requirement) and then replace the two front wheels as described above.

NOTE : Maximum lifting heights indicated above include a safety clearance of approximately 25 mm (1 in.)

1 Position jack pad directly below bogie beam jacking point.
2 Turn jack screw to bring jack pad and bogie beam ball pad into contact.
3 Check stability of jack set-up.
4 Jack wheel clear of ground.

**ON A/C 001-100,

(g)Fully deflate tire of wheel to be removed.

NOTE : If you must remove wheel for access, it is not necessary to deflate tire in the following conditions :
- tire is in the correct condition and
- tire pressure is in the Normal Operating Range (Ref. TASK 32-41-00 P. Block 601).

If you have not these two conditions, you must deflate tire.

(h)Cut and remove lockwire and remove screws (5) and washers (4).
(j)Remove debris guard (6).

CAUTION : DRAW DEBRIS GUARD ALONG WHEEL AXLE CENTERLINE TO AVOID DAMAGING TACHOMETER DRIVE SHAFT.

(k)Remove brake fan (Ref. 32-48-11, P. Block 401).
(l)Remove shroud (2).
(m)Loosen nut (17) to remove clamp (8). Remove casing (1).

(2)Removal

**ON A/C 101-200,

Post SB 32-2058 For A/C 101-200,

Post SB 32-2131 For A/C 101-200,

(g)Fully deflate tire of wheel to be removed.
NOTE : If you must remove wheel for access, it is not necessary to deflate tire in the following conditions :
- tire is in the correct condition and
- tire pressure is in the Normal Operating Range (Ref. TASK 32-41-00 P. Block 601).
If you have not these two conditions, you must deflate tire.
(h)Remove screws (5) and tab washers (4).
(j)Remove debris guard (6).

CAUTION : DRAW DEBRIS GUARD ALONG WHEEL AXLE CENTERLINE TO AVOID DAMAGING TACHOMETER DRIVE SHAFT.
(k)Remove brake fan (Ref. 32-48-11, P. Block 401).
(l)Remove shroud (2).
(m)Loosen nut (17) to remove clamp (8). Remove casing (1).
(2)Removal

**ON A/C ALL

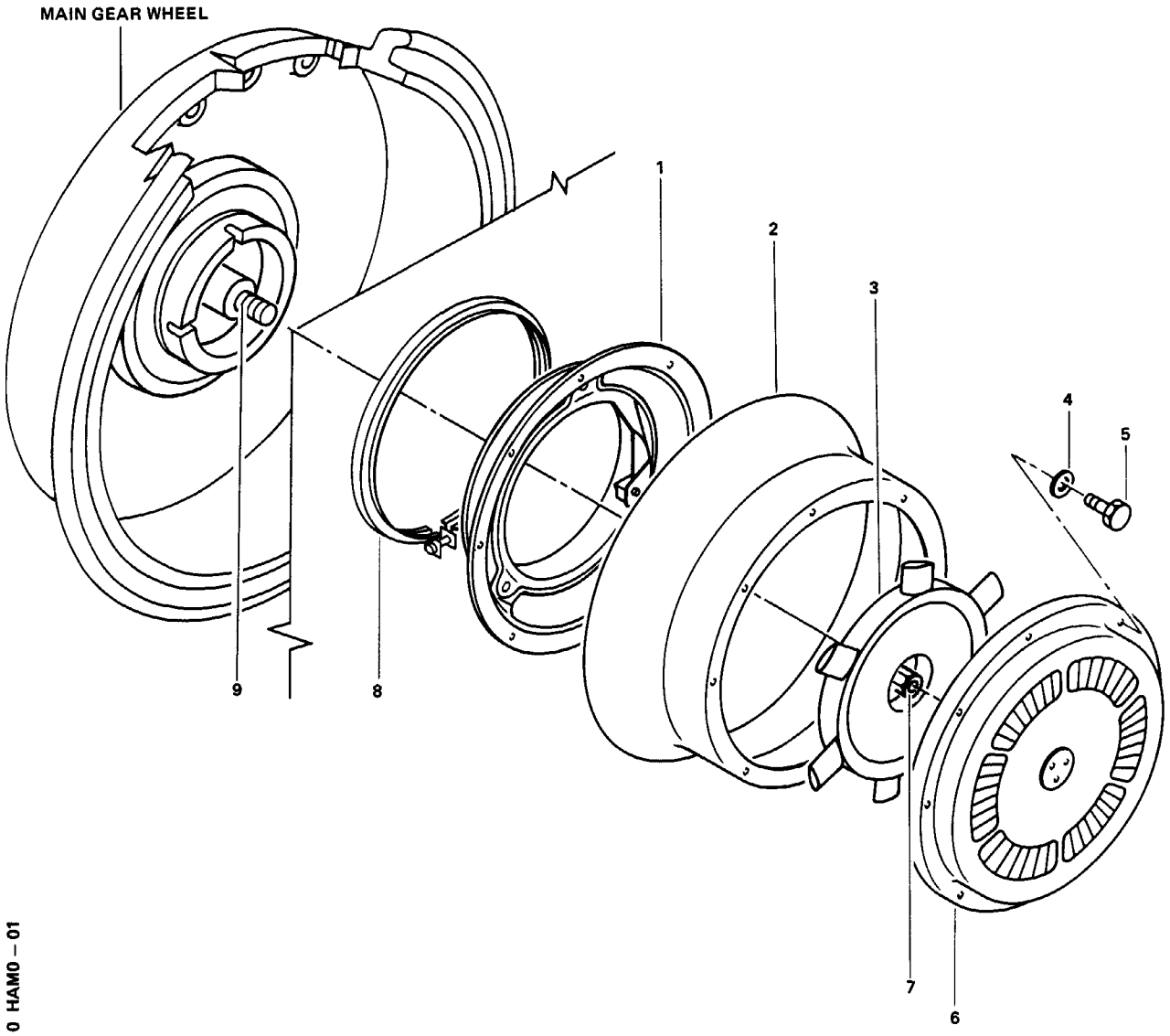
Post SB 32-2058 For A/C 101-200,

(Ref. Fig. 004, 005)

**ON A/C ALL

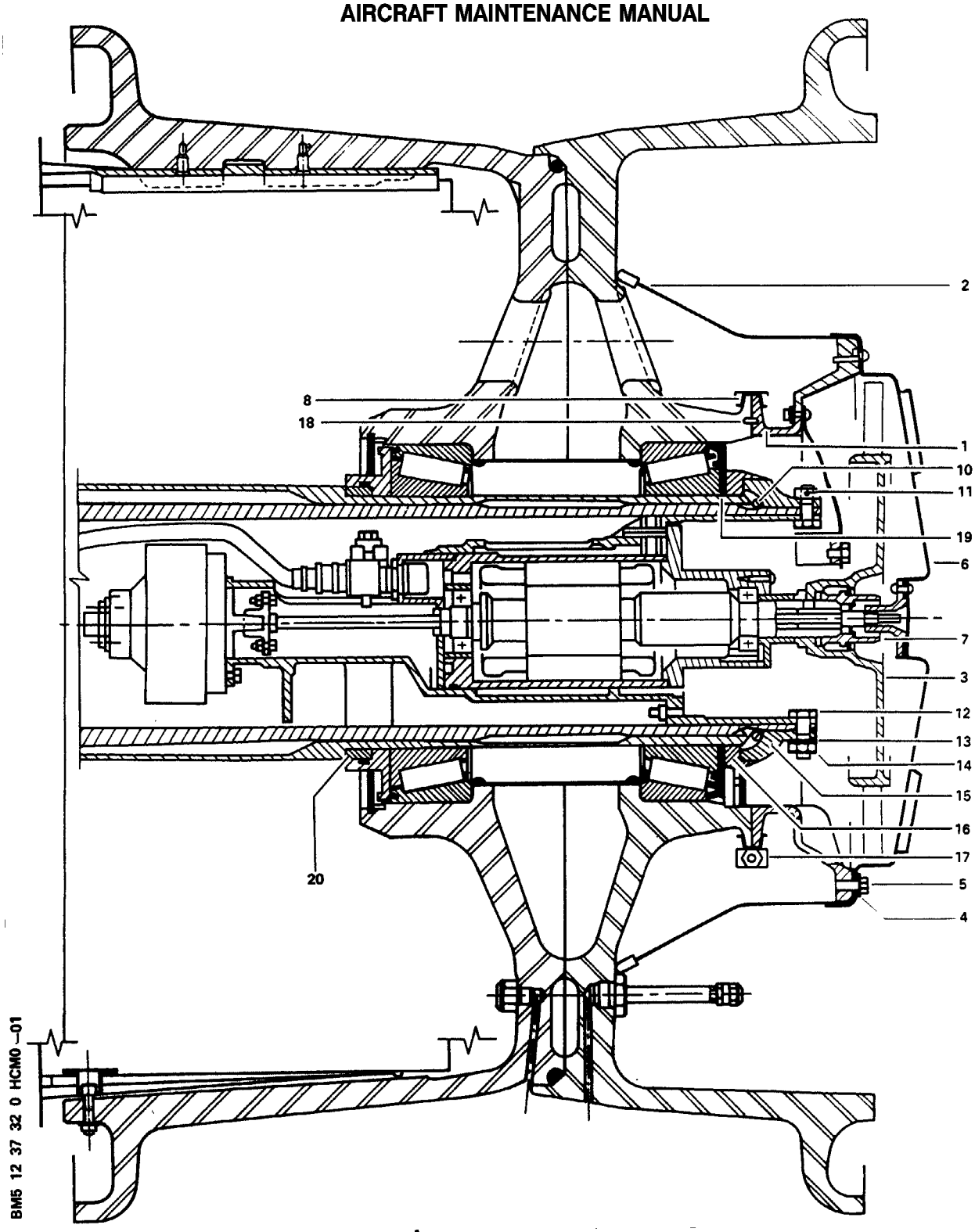
Post SB 32-2058 For A/C 101-200,

(a)Pull parking brake to immobilize rotors, thus facilitating wheel removal. The parking brake must remain applied during wheel removal.
NOTE : Display warning notice prohibiting release of parking brake handle during wheel removal/installation.
(b)Remove cotter pins, nuts (14), washers (13) and bolts (12).
(c)Remove wheel retaining nut (15) using adaptor H47682.
NOTE : Spacer (16) is crimped on nut (15).
(d)Install axle thread protector F46754-1000.
NOTE : Prior to wheel removal, lightly lubricate axle protector external circumference with Material No. 04-022.
R
(e)Remove wheel using adaptor 98A32001001200.



BM5 12 37 32 0 HAM0 – 01

Main Gear Wheel
Figure 004



Main Gear Wheel
Figure 005

WARNING : IF PARKING BRAKE HAS BEEN INADVERTENTLY RELEASED, DO NOT :
- MANUALLY ROTATE THE ROTORS
- APPLY PRESSURE TO BRAKE WHEN ROTORS ARE NOT ALIGNED.

WARNING : WHEEL ASSEMBLY WEIGHS ABOUT 140 KG (308 LBS). USE REMOVAL TOOL.

(3)Preparation before installation

NOTE : If the wheel is equipped with pressure sensor holder, make sure that the seal cap is properly installed and secured with nut and cotter pin.

R NOTE : Do not mix lithium and clay thickened grease.
R Clean and degrease the parts before you use Material No. 04-022.

(a)If a replacement wheel is to be installed, install heat shield protector from replacement wheel on removed wheel.

CAUTION : CHECK THAT REMOVED WHEEL IS NOT TOO HOT. A HOT WHEEL COULD DAMAGE THE PROTECTOR.

(b)Check that drive keys are in correct condition and securely attached.

NOTE : Check that axle sleeves locking ring (10) is correctly positioned.

WARNING : YOU MUST NOT PUT TOO MUCH GREASE ON THE AXLE SLEEVE. A VERY HOT BRAKE CAN CAUSE THE GREASE TO BURN AND CAUSE A FIRE.

R (c)Clean axle sleeve (19) with Material No. 11-002 or Material No. 11-026, dry with filtered compressed air then apply a light coat of grease,
R Material No. 04-001 or Material No. 04-022.

NOTE : If possible, for lubricating the axle sleeve, use the same grease than the grease that was used in shop for greasing the bearing. In this case, (to lubricate the bearing and the axle sleeve) the excess of grease taken from the bearings can be used to lubricate the axle sleeve.

- Clean and visually check the splines of tachometer drive shaft and debris guard adaptor at every wheel replacement. If wear is found too important (splines erased or backlash in rotation too important between male and female splined parts), drive shaft and fan debris guard must be replaced to avoid braking trouble.
  Make certain that bush (20) is correctly fitted on sleeve (19).
- Before reassembly, coat splines of tachometer drive shaft and debris guard adaptor splines with grease compound Material No. 04-003 only.

(d)Visually inspect component interface and/or adjacent area.

R (e)Do general check of brake unit with wheel removed (Ref. 32-42-27,
R P. Block 601).

R (f)If brake rotors are not aligned, do these steps :
- On panel 9VU, place PARKING BRAKE control handle in Normal (released) position.
- Align brake rotors with brake stators.
- On panel 9VU, place PARKING BRAKE control handle in on (applied) position.

(4)Installation

**ON A/C 001-100,

CAUTION : CHECK THAT AXLE SLEEVE (19) IS PRESENT.

R NOTE : Smear all screws and bolts with Material No. 04-022
R prior to installation.

NOTE : Check that axle sleeves locking ring (10) is correctly positioned.

R NOTE : Do not mix lithium and clay thickened grease.
R Clean and degrease parts before you use Material No. 04-022.

(a)Using gear wheel positioning adaptor, position wheel with valve facing outboard, and rotate to achieve correct positioning.

(b)Align brake rotor drive slots with wheel rotor drive keys.

(c)Remove axle protector screwing in unlocking screws to release holding pins.

R (d)Lightly grease axle thread with Material No. 04-022.

(e)Release parking brake.

(f)Install nut (15) with crimped spacer (16) using adaptor H47682.

(g)While manually rotating wheel, TORQUE axle nut (15) to between 25 and 30 m.daN (184 and 221 lbf.ft.) with adaptor H47682 to seat bearings.

(h)Back off axle nut (15) to between 5 and 10 m.daN (37 and 74 lbf.ft.) (to prevent potential bearings movement).

(j)While manually rotating wheel, TORQUE axle nut (15) to 15 m.daN (111 lbf.ft.) minimum and if necessary tighten to align holes in nut with holes in axle, but do not exceed 18 m.daN (131 lbf.ft.).

(k)Install bolts (12), washers (13), nuts (14) to safety axle nut (15). Cotter pins shall be installed perpendicular to axle.

(l)Tighten nuts (14) and install cotter pins (11).

R CAUTION : BEFORE YOU COMPLETE WHEEL INSTALLATION PROCEDURE, DO A VISUAL
R INSPECTION TO MAKE SURE THAT NO DAMAGE OCCURRED TO PARTS
R DURING PROCEDURE.
R MAKE SURE THAT TACHOMETER DRIVE SHAFT MOVES FREELY.
R MAKE SURE THAT THERE ARE NO SIGNS OF DEFORMATION (TWISTING),
R CORROSION, FRICTION, SCRATCHES AND STAINS :
R - ON DRIVE SHAFT
R - ON SPLINES OF TACHOMETER DRIVE SHAFT
R - ON SPLINES OF TACHOMETER HUBCAP, OR
R - ON SPLINES OF DEBRIS GUARD (IF BRAKE FANS ARE INSTALLED).
R YOU MUST REPLACE ALL DAMAGED PARTS. DAMAGED PARTS WILL
R PREVENT CORRECT ANTI-SKID BRAKING.

R (m)Visually inspect tachometer drive assy for damage. If you find damage,
R replace all damaged parts.

R (n)Install casing (1) carefully engaging tachometer drive shaft splines. Install clamp (8) with nut (17). TORQUE nut to between 0.28 and 0.34 m.daN (25 and 30 lbf.in.).

NOTE : Locating pin (18) serves to correctly position casing (1) and prevents its rotation.

R (p)Install shroud (2). Shroud shall bear against wheel over full circumference.
R (q)Smear fan drive shaft with Material No. 04-022.
R (r)Install fan (3) with nut (7). TORQUE nut to 3.4 m.daN (25.08 lbf.ft.)
R and wirelock.
R (s)Position debris guard (6).
1 Grease tachometer drive shaft splines (9) and debris guard adaptor splines with Material No. 04-003 only.
2 Check that debris guard (6) adheres to shroud (2).
3 Secure debris guard (6) to casing (1) thus immobilizing shroud (2) (check that it is correctly positioned with respect to wheel).
4 Make certain that tachometer drive shaft splines are correctly engaged. Install washers (4) and screws (5). TORQUE screws (5) to between 0.22 and 0.24 m.daN (19.46 and 21.23 lbf.in.) and wirelock.
R (t)Not applicable
R (u)Remove safety clips and tags and close circuit breaker 17GS.
R (v)Manually rotate wheel and check that no hard points hinder rotation.
R (x)Inflate tire of installed wheel (Ref. 12-14-32, P. Block 1).

**ON A/C 101-200,

Post SB 32-2058 For A/C 101-200,

Post SB 32-2131 For A/C 101-200,

CAUTION : CHECK THAT AXLE SLEEVE (19) IS PRESENT.
R NOTE : Smear all screws and bolts with Material No. 04-022 prior to installation.
NOTE : Check that axle sleeves locking ring (10) is correctly positioned.
R NOTE : Do not mix lithium and clay thickened grease.
R Clean and degrease parts before you use Material No. 04-022.
(a)Using gear wheel positioning adaptor, position wheel with valve facing outboard, and rotate to achieve correct positioning.
(b)Align brake rotor drive slots with wheel rotor drive keys.
(c)Remove axle protector screwing in unlocking screws to release holding pins.
R (d)Lightly grease axle thread with Material No. 04-022.
(e)Release parking brake.
(f)Install nut (15) with crimped spacer (16) using adaptor H47682.
(g)While manually rotating wheel, TORQUE axle nut (15) to between 25 and 30 m.daN (184 and 221 lbf.ft.) with adaptor H47682 to seat bearings.
(h)Back off axle nut (15) to between 5 and 10 m.daN (37 and 74 lbf.ft.) (to prevent potential bearings movement).
R
(j)While manually rotating wheel, TORQUE axle nut (15) to 15 m.daN (111 lbf.ft.) minimum and if necessary tighten to align holes in nut with holes in axle, but do not exceed 18 m.daN (131 lbf.ft.).
(k)Install bolts (12), washers (13), nuts (14) to safety axle nut (15).

Cotter pins shall be installed perpendicular to axle.

(l)Tighten nuts (14) and install cotter pins (11).

R CAUTION : BEFORE YOU COMPLETE WHEEL INSTALLATION PROCEDURE, DO A VISUAL
R INSPECTION TO MAKE SURE THAT NO DAMAGE OCCURRED TO PARTS
R DURING PROCEDURE.
R MAKE SURE THAT TACHOMETER DRIVE SHAFT MOVES FREELY.
R MAKE SURE THAT THERE ARE NO SIGNS OF DEFORMATION (TWISTING),
R CORROSION, FRICTION, SCRATCHES AND STAINS :
R - ON DRIVE SHAFT
R - ON SPLINES OF TACHOMETER DRIVE SHAFT
R - ON SPLINES OF TACHOMETER HUBCAP, OR
R - ON SPLINES OF DEBRIS GUARD (IF BRAKE FANS ARE INSTALLED).
R YOU MUST REPLACE ALL DAMAGED PARTS. DAMAGED PARTS WILL
R PREVENT CORRECT ANTI-SKID BRAKING.

R (m)Visually inspect tachometer drive assy for damage. If you find damage,
R replace all damaged parts.

R (n)Install casing (1) carefully engaging tachometer drive shaft splines.
Install clamp (8) with nut (17). TORQUE nut to between 0.28 and 0.34 m.daN (25 and 30 lbf.in.).

NOTE : Locating pin (18) serves to correctly position casing (1) and prevents its rotation.

- Install shroud (2). Shroud shall bear against wheel over full circumference.

R (p)Smear fan drive shaft with Material No. 04-022.

R (q)Install fan (3) with nut (7). TORQUE nut to 3.4 m.daN (25.08 lbf.ft.)
R and wirelock.

R (r)Position debris guard (6).

1 Grease tachometer drive shaft splines (9) and debris guard adaptor splines with Material No. 04-003 only.

2 Check that debris guard (6) adheres to shroud (2).

3 Secure debris guard (6) to casing (1) thus immobilizing shroud (2) (check that it is correctly positioned with respect to wheel).

4 Make certain that tachometer drive shaft splines are correctly engaged. Install tab washers (4) and screws (5). TORQUE screws (5) to between 0.22 and 0.24 m.daN (19.46 and 21.23 lbf.in.).

R (s)Not applicable.

R (t)Remove safety clips and tags and close circuit breaker 17GS.

R (u)Manually rotate wheel and check that no hard points hinder rotation.

R (v)Inflate tire of installed wheel (Ref. 12-14-32, P. Block 1).

**ON A/C ALL

Post SB 32-2058 For A/C 101-200,

(5)Test

(a)Perform a fan functional test (Ref. 32-48-00, P. Block 501).

NOTE : Check only the cooling fan of the wheel removed.

(6)Close-up

(a)Lower the aircraft onto its wheels (Ref. 07-12-00, P. Block 1).

(b)Position wheel chocks.